The Economics of Production and Marketing of Greenhouse Crops in Alberta

Government of Alberta

Agdex 821-59

September, 2011

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September 2011

Published by:

Alberta Agriculture and Rural Development
Economics and Competitiveness Division
7000 – 113 Street
Edmonton, Alberta
Canada T6H 5T6

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ISBN 978-0-7732-6089-4 (Online)

ISSN 1927-5714 (Online)

Acknowledgement

The author wishes to express sincere thanks to all the greenhouse operators in Alberta who willingly provided valuable data for this study. Assistance provided by Asif Mann, a consultant from Calgary, in collection of data from greenhouse operators across the province is gratefully acknowledged.

Assistance provided by Pauline Van Biert and Shukun Guan in entering and analyzing the data is greatly appreciated.

G. Nabi Chaudhary

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SECTION I

Introduction

The origin of the Alberta Greenhouse Crops Industry goes back over hundred years. It was in 1905 when Dutch and German settlers began plant production under protection cultivation. Since 1970, Alberta Agriculture, and Rural Development (ARD) has committed material resources to the development and growth of this industry in Alberta.

The greenhouse industry in Alberta has gone through several adjustments; therefore, the need was felt to develop costs and returns based on current conditions so the industry can change accordingly. Because of changing economic conditions, previously compiled information on the greenhouse industry in the late nineties had become more or less obsolete. The cost of natural gas, electricity and other greenhouse supplies became major concerns during the fall of 2000 and continues from these one. This study based on actual costs and returns from forty three (43) greenhouse operators across the province, provides more current data on costs and returns for major greenhouse crops.

Significant increases in the price of electricity and greenhouse supplies created some serious economic difficulties for greenhouse operators in the province. Realizing these difficulties, the provincial government announced energy assistance programs for the greenhouse industry as well.[1]

Major greenhouse crops grown include vegetables, bedding plants, potted flowers and ornamentals, cut flowers, herbs, perennials and tree seedlings. More recently, particularly over the last decade, a number of greenhouse operations have switched to producing tree seedlings under contract for the forestry industry. During the last decade, the greenhouse industry in Alberta has grown rapidly. This growth in the greenhouse industry has been prompted by consumer demand for fresh and quality produce. Alberta has the advantage in terms of lower taxes and input costs which also contributed to this growth. However, recent rapid increases of natural gas and electricity prices have somewhat dampened further expansion prospects for this industry in the short run.

The greenhouse industry in Canada represents the fastest growing sub-sector in horticulture with over $2.3 billion in sales. In 2001, area under glass and plastic in Canada was 17.8 million square meters (1 781 hectares). Despite high energy costs it increased by about four percent to over 18.5 million square meters (1 851 hectares), in 2002. In 2005, greenhouse area in Canada was estimated at just under 19.9 million square meters (1 989 hectares). In 2008, greenhouse total area reported by Statistics Canada was 21.8 million square meters, (2 184 hectares) an increase of almost 10 percent over in 2005.

As mentioned above, greenhouse area in Canada continues to grow year after year. In 2010, greenhouse area was estimated at about 22.9 million square meter (2 287 hectares), an increase of almost 15 percent over the area in 2005.

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[1] Alberta government announced a one-time gas rebate of $0.40 per square foot during 2000 and 2001. Another natural gas rebate program was announced in the fall of 2003. This program expired on March 31, 2009.

The size of Alberta's greenhouse industry, under both glass and plastic, was about 557 620 square meters (56 hectares) in 1990. In 2005, the area under cover in Alberta has increased to over 1.169 million square meters (117 hectares), an increase of over 116 percent during the last fifteen years or about 7.5 percent increase on average per year. A recent survey of the greenhouse industry across the province estimated greenhouse area (under cover) at 1.23 million m^2 (121 hectares).

Alberta greenhouse industry is ranked fourth in the country when compared to the other provinces. Ontario continues to lead the greenhouse industry with 13.3 million square meters (1 330 hectares) area, followed by British Columbia at 4.9 million square meters (49 hectares) and Quebec at 2.7 million square meters (267 hectares). In percentage terms, Ontario accounts for 53 percent of all greenhouse area in Canada, with British Columbia at 21 percent and Quebec at 12 percent. Alberta accounts for about five (5) percent of the greenhouse area in Canada.

Approximately 99 percent of the greenhouse area in Alberta is under commercial production, with the balance confined to institutions such as universities, research stations and colleges. Most of the Alberta's greenhouse operations are highly diversified and are equipped with most modern equipment to achieve production efficiencies. The gross revenue generated by the greenhouse industry in 2010 was estimated at around $160 million, with an investment or total value of assets of about $275 million.

This report provides the most current information on greenhouse production costs and returns for the major greenhouse crops (bedding plants/ornamentals, cut flowers, cucumbers, peppers, tomatoes and tree seedlings).

Objectives of the Study

The major objectives of the study were:

1) Determination of the structure of the greenhouse industry in Alberta.
2) Estimation of greenhouse production costs and returns by major crops.
3) Identification of the main factors influencing production and marketing of greenhouse crops in Alberta.
4) Identification of major problems experienced by greenhouse producers in Alberta.

The Study Sample

A questionnaire specifically designed for greenhouse operations was used to obtain the required information from a selected sample of greenhouse operators across the province. Forty (40) greenhouse operators were interviewed to obtain production costs and returns information on bedding plants/ornamentals, cut flowers, cucumbers, peppers, and tomatoes for the 2008 crop. Vegetable producing greenhouses (cucumbers, peppers and tomatoes) were divided into two groups, i.e. Medicine Hat/Redcliff and North-Central to compare natural gas and other costs between the two groups. In case of peppers there were only two

(2) producers from Medicine Hat/Redcliff group; therefore their information is not included in the report for data confidentiality purpose.

Method of Analysis

After completion of the questionnaire, raw data were reviewed to make sure that no information was missing before entering it for analytical purposes. In the past, we used a mainframe computer program "SPSS" (Statistical Package for the Social Sciences) to analyze both the individual farm reports as well as computing group averages. A Paradox 9 program (micro-computer database) was used to analyze the greenhouse data. This program is very versatile and allows changes and updates in many of the cost allocations.

Each greenhouse operation was analyzed separately. The study sample was divided by crop groups. In order to preserve confidentiality of the data obtained, no group averages were developed for greenhouse crops with less than three participants. Data collected for the 2008 crop year was updated to 2010 crop year by using farm input price indices (FIPIs) and prices received for various crops.

SECTION II

Greenhouse Operations in Alberta

Although greenhouses in Alberta are scattered throughout the province, almost two-thirds of these operations are located in the south and south-central regions. The area around Medicine Hat/Redcliff is called the "greenhouse capital of the Prairies". This area is well known for the Red Hat Co-op (a producer organization responsible for marketing of greenhouse vegetables) and the large number of greenhouses there. Most greenhouse operations are located in cities and towns because of easy access to labour, marketing facilities, utilities and the services necessary for a greenhouse operation. Because of very high land prices and taxes, during the last several years a few new greenhouses have been built at a distance from major population centers. Distribution of greenhouses in Alberta is shown in Figure 1.

An Overview of the Greenhouse Industry in Alberta and Canada

Data in Tables 1 and 2 provide an historical overview of the growth of the greenhouse industry in Alberta and Canada from 1981 to 2010. During the thirty years, i.e. 1981 to 2010 greenhouse area in Alberta increased by almost 210 percent. On an annual basis it increased by about seven (7) percent. Since 2001, greenhouse area in Alberta has increased by about 13 percent to 117 hectares in 2005. It further increased by another four hectares to 121 hectares in 2010. Fastest growth in greenhouse area occurred between 1996 and 2001 both in Alberta and at the national level. Greenhouse area in Alberta increased by 41 percent during these five years and almost by 40 percent at the national level.

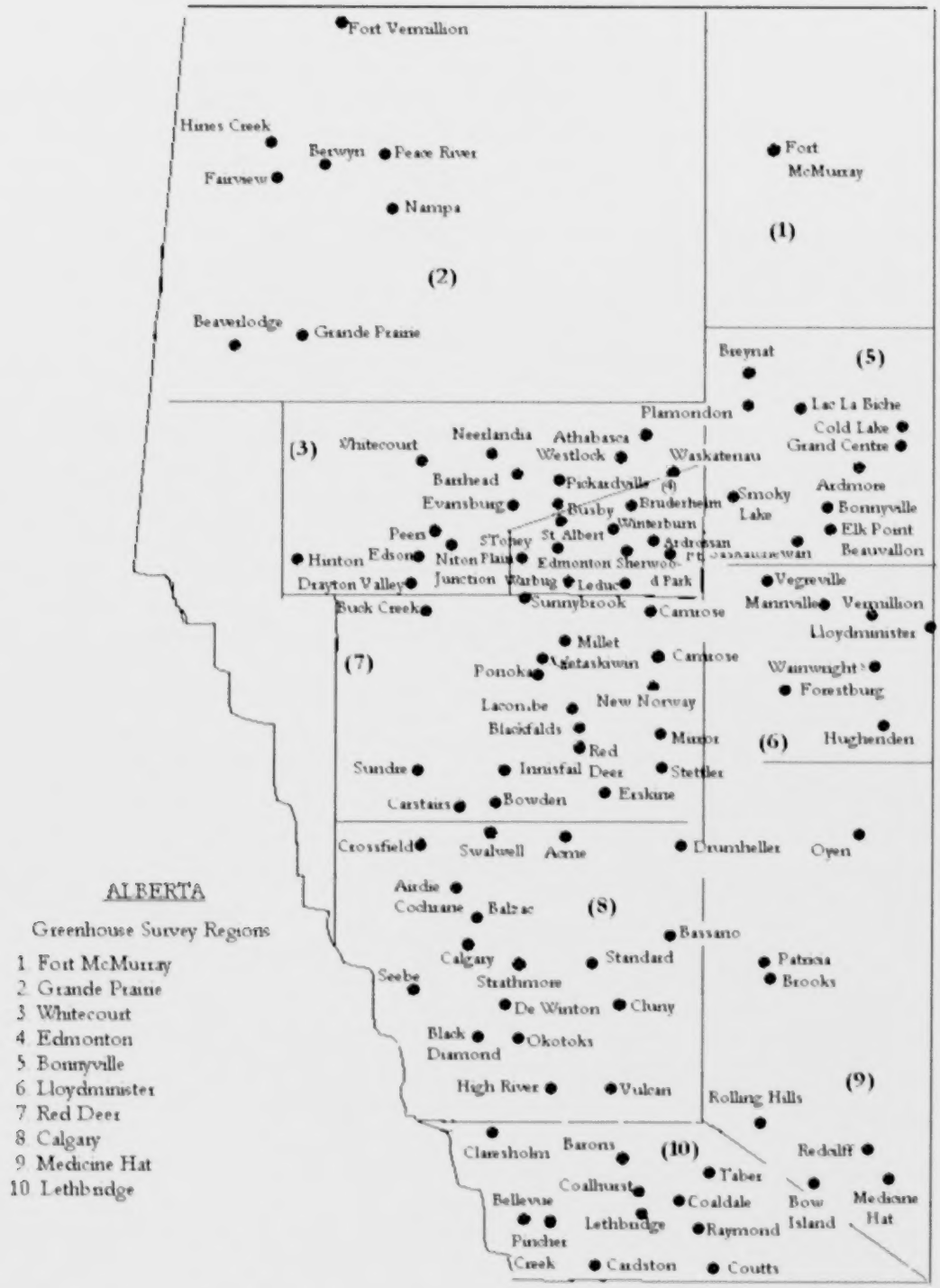
Table 1

Greenhouse Area in Alberta and Canada, 1981-2010 (Hectares)								
	1981	**1986**	**1991**	**1996**	**2001**	**2003**	**2005**	**2010**
Alberta	39	52	53	74	104	115	117	121
Canada	665	719	844	1 274	1 781	1 879	1 989	2 287
Percent Alberta	5.8	7.2	6.3	5.8	5.9	6.1	6.1	5.4

Table 2

Greenhouse Area in Alberta and Canada, 1981-2010 (Million Square Meters)								
	1981	**1986**	**1991**	**1996**	**2001**	**2003**	**2005**	**2010**
Alberta Area	0.389	0.519	0.534	0.74	1.046	1.149	1.169	1.213
Canada Area	6.65	7.19	8.44	12.75	17.8	18.79	19.89	22.86
Percent Alberta	5.8	7.2	6.3	5.8	5.9	6.1	6.1	5.4

Figure 1. **Location of Greenhouses in Alberta**



Survey of the Greenhouse Industry

According to a survey[2] of the greenhouse industry completed in 2010, there were approximately 328 commercial greenhouse operations in Alberta with a total area of 1 213 311 square meters or 300 acres (121 hectares). Since 1986, the greenhouse industry in Alberta has increased by 95 percent, i.e. an average annual growth of about four (4) percent per year.

This comprehensive survey, undertaken by the Alberta Agriculture and Rural Development Department in cooperation with Alberta Greenhouse Growers Association (AGGA) provided detailed information on the size and structure of the greenhouse industry in the province. An earlier survey done for the greenhouse industry reported on the types of crops grown in greenhouses, heating systems, types of greenhouse material, marketing of greenhouse produce, (wholesale and retail operations) and greenhouse operators' concerns, etc.

The three regions with the largest greenhouse area in the province are Medicine Hat (41 percent), Red Deer (16 percent), and Edmonton (10 percent). The remaining 33 percent of greenhouse area is scattered throughout the province, from Peace River in the north to Lethbridge in the south. Tables 1 and 2 on page 4 provide information on the growth of the greenhouse industry during the last three decades, i.e., from 1981 to 2010 in hectares and square meters, respectively.

Table 3 lists the number of greenhouse operations surveyed in each city and major town. The province was divided into these areas to obtain a better understanding of the location and size of greenhouse operations.

[2] Abdusalam Asif Maan, "Profile of the Greenhouse Industry in Alberta 2010", Agriculture and Rural Development, Edmonton, Alberta.

Table 3

Number of Greenhouse Operations by Size in Alberta by Regions, 2010						
Region	**Industry Area (m^2)**	**Size of Operation (Sq. M.)**				**Number of Greenhouses by Region**
		< 1 000	**1 000 to 2 000**	**2 001 to 4 000**	**>4 000**	
Fort McMurray	2 788	3	0	2	0	2
Grande Prairie	87 361	11	6	0	11	28
Whitecourt	25 619	4	11	11	2	28
Edmonton	124 535	17	17	4	9	47
Bonnyville	88 290	6	6	4	4	21
Lloydminster	26 022	9	4	6	0	19
Red Deer	189 550	19	13	9	24	64
Calgary	144 052	9	6	9	6	30
Medicine Hat	492 565	2	0	15	58	75
Lethbridge	32 528	2	2	4	4	13
TOTAL OPERATIONS	**1 213 311**	**79**	**66**	**64**	**118**	**328**
Percent of Operations	-	**24**	**20**	**20**	**36**	**100**

Data in Table 3 shows that 24 percent (79) of greenhouse operations are less than 1 000 square meter. Twenty percent each of the operations are between 1 000 to 2 000 and 2 000 to 4 000 square meter, respectively. About 36 percent (118) of greenhouse operations in Alberta are in the over 4 000 square meter group.

Statistics Canada also conducts a survey of the greenhouse industry every year to identify the number of commercial operations in the province, crops grown and the total output of crops produced in a controlled environment. In 1988, although all greenhouse operations in Alberta were contacted by Statistics Canada, only 76 farms reported on their operations. The area reported by these farms was 331 691 m^2 square meters, which was about half of the area reported in the 1986 census. In 2006 census, the number of farms reporting on their operations was 522. Greenhouse area reported by these farms was estimated at 1 169 386 m^2 square meters. However, in 2008 according to Statistics Canada Survey, the number of farms reporting greenhouse operations decreased to 335 with 967 956 m^2 area. This represents almost 36 percent decrease in number of greenhouse farms from 2006 census and over 17 percent decrease in area during the same period. For 2009, Statistics Canada Survey reported 335 greenhouse farms in Alberta with 1 019 434 m^2 area.

Greenhouse Crops

Greenhouses in Alberta produce many kinds of flowers; chrysanthemums, roses and geraniums being the most common potted plants. Outdoor flowers such as petunias and

marigolds are also produced in these greenhouses. Some greenhouse operations concentrate on importing tropical plants, which are acclimatized to Alberta conditions before resale. The most commonly grown greenhouse vegetables are cucumbers, tomatoes, peppers and lettuce. During the last few years' attempts have been made to grow eggplants, cauliflower, cabbage, herbs and Chinese vegetables, as well as other crops.

Table 4 lists the types of crops grown in greenhouses across the province. The only greenhouses growing a single crop are ones producing vegetables and a few of these also grow bedding plants. A considerable number of greenhouses produce more than one crop.

Greenhouses surveyed were selected to obtain production costs and returns data for all major greenhouse crops including tree seedlings grown on contract for the forestry industry. Greenhouses producing a variety of crops were in operation year round, whereas the vegetable greenhouses were in operation for about ten months, February through November. Those producing bedding plants were in operation for about five months, February to June.

Table 4

Distribution of Greenhouse Area by Crops			
Greenhouse Crops	**No. of Growers**	**Area (m^2)**	**% of Area by Crops**
Vegetables			
Cucumbers	114	327 897	27
Tomatoes	117	196 859	16
Peppers	90	81 320	6
Lettuce	28	6 842	1
Egg Plant	6	409	
Other Crops	6	6 832	1
Sub-Total	**361**	**620 159**	**51**
Floriculture			
Bedding Plants	212	223 809	18
Potted Flowers & Ornamentals	42	56 479	5
Cut Flowers	21	41 250	3
Herbs	31	14 520	1
Perennials	136	92 035	8
Sub-Total	**442***	**428 093**	**35**
Tree Seedlings	**26**	**165 058**	**14**
TOTAL	**829***	**1 213 311**	**100**

*Growers producing multiple crops. Actual number of growers surveyed for crops grown was 328.

Greenhouse Crops Area by Regions

Table 5 provides information on the crop size of the greenhouse industry in the province by regions. The largest greenhouse area, with 620 159 square meters (51 percent) was reported under vegetables, followed by 428 093 square meters (35 percent) under floriculture and 165 058 square meters (14 percent) under tree seedlings. The Medicine Hat region which includes Redcliff reported 69 percent of the greenhouse area under vegetables. Three largest floriculture production centers are Red Deer, Edmonton, and Calgary. Bonnyville and Grande Prairie are the leading tree seedling production regions followed by Medicine Hat/Redcliff area at (24 percent).

Table 5

Greenhouse Vegetables, Floriculture and Tree Seedlings Production Area by Regions, 2010				
Region	**Greenhouse Area By Crops (Sq. M.)**			
	Vegetable Area (m^2)	**Floriculture Area (m^2)**	**Tree Seedlings Area (m^2)**	**Total Area by Region**
Fort McMurray	1 366	1 422	0	2 788
Grande Prairie	238	30 596	56 527	87 361
Whitecourt	4 494	29 521	592	25 619
Edmonton	46 374	78 161	0	124 535
Bonnyville	14 499	12 767	61 024	88 290
Lloydminster	8 407	17 615	0	26 022
Red Deer	27 936	156 874	4 740	189 550
Calgary	80 582	60 745	2 725	144 052
Medicine Hat	425 734	27 381	39 450	492 565
Lethbridge	19 517	13 011	0	32 528
Total Area	**620 159**	**428 093**	**165 058**	**1 213 311**
Percent of Total	**51**	**35**	**14**	**100**

Note: Conversion rate: One Square Meter = 10.76 sq. ft.
N=328

Figure 2. Greenhouse Vegetables, Floriculture and Tree Seedlings in Alberta

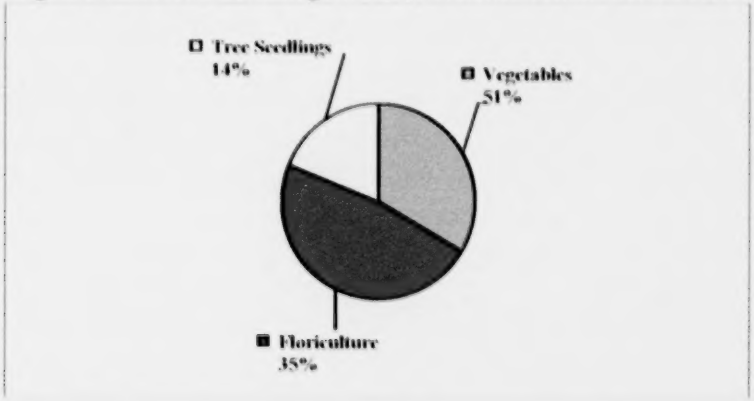


Figure 2 is based on the data presented in Table 5. Vegetables have the biggest size, 51 percent in the province, followed by 35 percent for floriculture and 14 percent for tree seedlings.

Marketing of Greenhouse Crops

Greenhouse operators use several channels to market their produce. The most important of these were retail facilities owned by greenhouse operators, either attached to the greenhouses or located in an urban area; other retail and wholesale facilities; the Co-op at Redcliff, Pick-N-Pack Co-op at Lacombe and farmers' markets in various centers. The Red Hat Co-op at Redcliff serves as the focal point for the marketing of long english cucumbers, tomatoes and peppers grown in and around Medicine Hat/Redcliff. Cucumber producers in north-central Alberta market their produce through Pick-N-Pack (a cooperative of growers in Lacombe). Greenhouse operators pay a commission or fee set by the Board of Directors of the Co-ops to cover grading, packaging, storage, marketing and administration costs.

In north-central Alberta, greenhouses producing vegetables and bedding plants sell a large percentage of their produce at the gate and through rented stalls/booths in shopping centers and farmers' markets. Farmers' markets have become popular marketing outlets, especially during the bedding plant season.

Physical Characteristics of Greenhouses

Greenhouses in Alberta range from small sash roof "lean-to" houses constructed of a wood-frame sash, to large modern steel frame houses with truss supported roofs. Most new greenhouses are made of steel, wood or masonry covered with either glass, fiberglass, double plastic or a single layer of plastic. A survey by the Alberta greenhouse industry in 2010 reported over 1.213 million square meters of greenhouse area in Alberta. The number of greenhouse operations surveyed was 328. During the last decade the greenhouse industry in Alberta has increased by 10.5 percent. New greenhouse operations are equipped with most modern and efficient crop production tools.

The major internal features of greenhouse systems in Alberta are as follows:

Heating Systems:

A year round greenhouse operation is heated, using natural gas, steam, propane or coal to maintain optimum temperatures for crops grown during the winter months. Some vegetable producing greenhouses operate ten months of the year and close down during December and January. Greenhouses producing cut flowers operate year around and thus have high heating requirements. Natural gas burners heat almost all of the greenhouses in southern Alberta and when combined with stovepipes these burners provide sufficient heating through natural air movement. Greenhouses in northern Alberta are equipped with natural gas boilers and hot water pipes for heating. All boiler-heating systems have automatic temperature control devices.

In addition to heating systems, most greenhouses in Alberta are equipped with a pad and fan cooling system. The cooling system is essential if temperatures are to be lowered during the hot summer months.

Table 6 presents the various types of heating systems used in greenhouse operations in the province. In some cases a grower has more than one heating system. During the last four to six years, almost a dozen greenhouse operations have either completely switched over to using coal or added coal fired furnaces to reduce natural gas costs.

Table 6

Type of Heating Systems Used in Greenhouses		
Responses	**Systems**	**Percent of Responses**
300	Natural Gas Furnace	79
131	Hot Water	30
17	Steam	4
19	In-floor heating	4
17	Propane Furnace	4
19	Soil Heating	4
9	Electric	2
17	Stove Pipe Heater	4
47	Coal Deckker	12
2	Bio-therm	1

N=328

Watering Systems:

The watering of ground beds is usually done by the use of soaker hoses, which run parallel to each side of the bed. Bench beds and potted plants are usually watered with the use of chapin tubes. Other operations may use water supply pipes along with garden hoses.

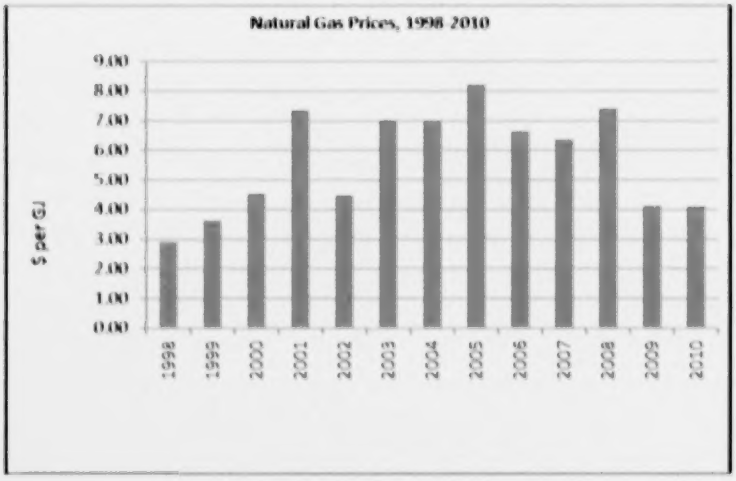
Supplementary Lighting:

Very few greenhouses have supplementary lighting. Those that do, make use of ordinary lamps, or High Pressure Sodium (HPS) lights in winter to increase flower production and thus adjust the supply and demand balance usually five to six feet apart. Supplementary lighting is mostly used for producing chrysanthemums and roses.

Data for natural gas prices in Table 6 were obtained under the Alberta Input Monitoring Systems (AIMS). Each month data on several farm input prices are collected from 25 stations across the province. These prices do not include service and delivery charges for natural gas. In 1999, the natural gas price increased by 25 percent over 1998 and it further increased by another 25 percent in 2000. Natural gas price increase in 2001 was by about 62 percent from a year earlier. However, the overall increase in 2001 was almost 153 percent from 1998. In 2002, natural gas price decreased significantly. But in 2003, it went back up to $7.00 per GJ, an increase of over 56 percent. In 2004, natural gas price showed a marginal decrease but increased to a record level in 2005, thus putting a serious economic constraint on businesses relying heavily on natural gas. In 2006 and 2007, natural gas price decreased by 19 and 23 percent respectively over in 2005. Volatility in natural gas prices continued into 2008 leading to an increase of about 16 percent over in 2007. In 2009, natural gas price decreased dramatically by 46 percent to a level prior to the Fall of 2000. Natural gas industry analysts predict that it is expected to remain somewhat volatile during the next several years. There is a good possibility that industry will not face the natural gas price crunch for the next several years it endured from 2003 to 2008.

Table 7

Natural Gas Prices 1998-2010	
Year	**$ per GJ**
1998	2.91
1999	3.63
2000	4.54
2001	7.35
2002	4.48
2003	7.00
2004	6.95
2005	8.22
2006	6.64
2007	6.37
2008	7.41
2009	4.12
2010	4.11



Source: Alberta Farm Input Prices, Statistics and Data Development Branch, Agriculture and Rural Development, Edmonton, Alberta.

SECTION III

Greenhouse Production Costs and Returns

Computation of Individual Cost Components

Interest on Investment:

Interest is defined as a sum paid or calculated for the use of capital. The sum is usually expressed in terms of a rate or percentage of the capital involved, called the interest rate.

Interest is charged for the use of investment capital. Had the capital not been invested to buy a specific asset, it could have been used elsewhere, either within or outside the firm and would have brought some additional return to the firm. However, for the purposes of this study, actual paid capital interest was used to arrive at capital costs.

Depreciation:

Depreciation is defined as the loss in value of an asset over time, mainly as a result of obsolescence. In the case of buildings and equipment, it is that portion of the decrease in value resulting from the passage of time. Obviously, part of the reduced value of the buildings and equipment is the result of usage and is considered a variable cost. The entire depreciation is considered a fixed cost.

In computing depreciation, a 10 percent allowance or salvage value is taken from the purchase price of the buildings and equipment. The following formula was used in arriving at depreciation for buildings and equipment.

$$\text{Depreciation} = \frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Number of Years of Life}}$$

Land Value:

Land associated with each greenhouse operation was valued at $5,500 per acre, irrespective of its location. This value was determined through real estate values for good farmland suitable for a greenhouse operation. It can be argued that allocation of such a value distorts cost of land in and around urban areas relative to farmland. However, for uniformity and reasonable cost estimates, it was decided to standardize the land value regardless of its location. Researchers are aware that land values in cities or towns are much higher than $5,500 per acre, but if market values were used for land acquired ten years ago, it would lead to artificially much higher fixed costs that would greatly inflate overall production costs. Most of the greenhouse operators surveyed have been in business for quite some time, with the exception of a few who got started within the last eight years or so.

Property and Business Taxes:

Taxes on real estate include payments made on the assessed value of the greenhouse operation less any assessment for the greenhouse operator's residence or operations other than the greenhouse. There is a business tax on greenhouses located in urban municipalities. Exact amounts of property and business taxes were included in the costs.

Labour Costs:

Hired labour costs included the amount of wages and any benefits received by the hired workers, such as contributions to Workers' Compensation, Canada Pension Plan, and Unemployment Insurance.

The hours spent by the operator and his/her families in greenhouse production were estimated. An operator's labour was valued at $10.50 per hour and family labour was valued at either the rate paid to hired labour or the actual amount paid to family members.

Production Materials and Supplies:

Production materials and supplies included the purchase of cuttings, seed plants, fertilizers, chemicals, soils, vermiculite, perlite, peat moss, straw, peat pots and plastic. Costs of production materials and supplies were the actual figures provided by the study participants.

Heating Costs:

Almost all greenhouse operators had reasonably accurate costs for heating the greenhouses with natural gas. Monthly bills were helpful in arriving at the total heating costs. A sudden increase in natural gas costs during the fall of 2000 and continuing into the following years prompted major concerns for economic viability of the greenhouse industry at that time. Natural gas price peaked to $9.85 per GJ in July 2008. Starting in August 2008, natural gas price has been on the decline and hovers around $3.25 to $5.00 per GJ since February 2009.

Utility Costs:

Utility costs included electricity, telephone and water. Where the utility bill was combined with the greenhouse operator's residence, the operator was asked to apportion the bill to arrive at total utility costs for the greenhouse operation.

Transportation Expenses:

Expenses for trucks or other vehicles owned by greenhouse operators were apportioned according to their use in the greenhouse operation, personal and leisure driving. Freight charges paid to commercial or private carriers for hauling greenhouse produce or supplies were included in the transportation expenses.

Repairs and Maintenance Costs:

Maintenance costs included repairs to greenhouse structures, boilers, heating equipment, tractors and all other machinery and equipment associated with the greenhouse operation.

Marketing Charges:

Marketing charges were the actual amount paid by each greenhouse operator for having produce marketed through the Redcliff and Edmonton Co-ops. These charges covered grading, packaging, marketing and administrative fees. The charges paid by each grower were included as a cost item in the study.

Miscellaneous Costs:

These costs include legal and accounting fees, office supplies, bad debts, donations, membership fees, insurance costs and other costs incurred in a greenhouse operation, but not reported under any other heading.

SECTION IV

Greenhouse Production Costs and Returns for Cucumbers

In 2010, cucumber production represented about 27 percent of the greenhouse area in Alberta. Long English cucumbers are the second largest crop produced in a controlled environment closely followed by bedding plants. Almost 80 percent of greenhouse cucumber production is in the "Greenhouse Capital of the Prairies" - the Medicine Hat/Redcliff area.

Production costs and returns presented in Tables 8 to 11 are based on data obtained from twelve greenhouse cucumber producers across the province (southern and central Alberta). Nine of the greenhouse operations surveyed produced cucumbers that were from the Medicine Hat/Redcliff area and three from central Alberta. Due to the differential in natural gas costs between Medicine Hat/Redcliff area and central Alberta, cucumber producing greenhouses surveyed were divided into two respective groups.

Production costs include operating costs, investment costs, depreciation (buildings, equipment and automotives) and operator's labour. For any enterprise or operation to be economically viable, it must recover operating costs.

Investment for Cucumber Producing Greenhouses in Medicine Hat/Redcliff

The average greenhouse area for the nine (9) cucumber producing greenhouses in Medicine Hat/Redcliff area was 9,077 square meter (91,890 square feet). It was significantly higher than the industry average of 2,898 square meter (31,179 square feet). Land associated with these greenhouses was estimated to be just over four hectares (10.4 acres) valued at $57,203 or $6.30 per square meter of greenhouse area.

The average investment in greenhouse buildings for cucumber producing greenhouses amounted to $653,687 per greenhouse ($72.02 per square meter). Average investment in machinery and equipment was reported at $466,216 per greenhouse ($51.36 per square meter). When land, buildings, machinery and equipment investments were combined, total investment was estimated at $1,177,106 per greenhouse. In terms of dollars per square meter it was $129.68. Details on land, building, machinery and equipment investment and depreciation are given in Table 8.

Greenhouse Production Costs and Returns for Cucumbers in Medicine Hat/Redcliff

Gross Return:

Gross return (A) represents sales of cucumbers through the co-ops and other market outlets. Gross revenue for an average greenhouse with production area of 8,540 square meter was estimated at $691,313 or $80.95 per square meter (Table 9). When crop insurance

Table 8 **Medicine Hat/Redcliff**

Average Investment for Cucumber Producing Greenhouses, 2010

Greenhouse Area: 9 077 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	57,203.50	6.30
Buildings	653,686.67	72.02
Machinery and Equipment	466,215.59	51.36
TOTAL INVESTMENT	**1,177,105.76**	**129.68**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land- Building Site:	**332,444.44**		
Greenhouse Buildings:	**653,686.67**	**13.0**	**24,601.11**
Equipment:			
Refrigeration/Freezer Storage	0.00	3.0	0.00
Warehouses/Storage Sheds	9,729.99	15.1	540.56
Fuel Tanks	150.01	3.9	8.33
Houses (25%)	64,500.01	25.3	3,583.33
Lighting	1,440.00	6.1	80.00
Heating System	224,100.00	12.2	12,450.00
Ventilation System	56,400.01	0.0	3,133.33
Humidity Control	19,500.01	8.9	1,083.33
Benches	2,300.00	5.2	127.78
Irrigation System	11,217.78	10.1	1,402.22
Water Pumps/Sand Filters	4,897.78	8.0	612.22
Soil Mixers/Flat Fillers/Seeding Lines	0.00	0.0	0.00
Generators	10,897.78	15.7	1,362.22
Roto-Tillers	0.00	3.0	0.00
Storage/Mixing Tanks	4,720.00	9.9	590.00
Sterilizers	0.00	0.0	0.00
Sprayers	4,635.56	9.1	579.44
Carts/Dollies	13,452.44	11.7	1,681.56
Fertilizer Injectors	2,884.00	9.6	360.50
Small Tools/Hardware	4,546.67	10.8	568.33
Sub-Total	**435,372.04**		**28,163.15**
Machinery and Vehicles			
Bobcats/Forklifts	7,511.11	9.1	938.89
Trucks	21,110.22	21.1	2,638.78
Other Machinery	2,222.22	3.8	277.78
Sub-Total	**30,843.55**		**3,855.45**

Production Costs and Returns for Cucumber Producing Greenhouses, 2010

Production Area: 8 540 sq. m.

Number of producers: 9

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			691,313.00	80.95
	2. Crop Insurance Receipts			1,964.20	0.23
	3. Miscellaneous Receipts			32,452.00	3.80
	GROSS RETURN			**725,729.20**	**84.98**
(B)					
	1. Growing Media, Seed/Cuttings			68,402.83	8.01
	2. Fertilizer and Chemicals			22,814.04	2.67
	3. Greenhouse Insurance			10,682.11	1.25
	4. Trays, Boxes and Other Packaging			1,135.68	0.13
	5. Freight and/or Trucking Costs			1,200.41	0.14
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			9,033.01	1.06
	7. Repairs - Buildings and Equipment			13,646.57	1.60
	8. Utilities: Natural Gas	0.00 GJ		77,024.68	9.02
	9. Electricity	0.00 KW		11,529.00	1.35
	10. Water	0.00 M^3		7,520.20	0.88
	11. Phone			2,980.99	0.35
	12. Custom Work and Specialized Labour			2,954.86	0.35
	13. Marketing Costs			144,336.62	16.90
	14. Assoc. Dues, Prof'l Fees and Promotion			8,043.40	0.94
	15. Small Tools, Supplies and Misc. Expenses			7,687.67	0.90
	16. Operating Interest Paid			709.29	0.09
	17. Labour Insurance/Benefits			5,632.70	0.66
	18. Hired Labour	11,816.39 hours		169,812.12	19.88
	19. Unpaid Labour	0.00 hours		0.00	0.00
	VARIABLE COSTS			**565,246.18**	**66.19**
(C)					
	1. Property/Business taxes			9,143.88	1.07
	2. Equipment and Building a) Depreciation			56,620.20	6.63
	b) Lease Payments			427.00	0.05
	3. Paid Capital Interest			16,267.86	1.90
	TOTAL CAPITAL COSTS			**82,458.95**	**9.66**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**591,084.92**	**69.21**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**647,705.12**	**75.84**
(F)	**GROSS MARGIN**	**(A-D)**		**134,644.28**	**15.77**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**78,024.08**	**9.14**
	RETURN TO INVESTMENT	**(A-E+C2a)**	11.4%	**134,644.28**	**15.77**
	RETURN TO EQUITY	**(A-E)**		**78,024.08**	**9.14**

and miscellaneous receipts were included to cucumber sales, total gross revenue for greenhouse cucumber production increased to $725,729 or $84.98 per square meter.

Variable Costs:

Variable costs (B) include all out-of-pocket costs and unpaid labour, which amounted to $565,246 per greenhouse with average production area of 8 540 square meter (91,890 square feet). In terms of variable costs per square meter, these were estimated at $66.19 for producing cucumbers in greenhouses in the Medicine Hat/Redcliff area. Because of the producers' interest in knowing their variable costs for each basic unit of production, these costs were broken into as much detail as possible. The most significant cost items were labour, marketing costs, natural gas costs, followed by growing media/seed, fertilizer and chemical costs.

Capital Costs:

Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. Average total capital cost for this group of greenhouse operators amounted to $82,459 per greenhouse or $9.66 per square meter for greenhouse cucumber production in 2010.

Cash Costs:

Cash costs (D) include all out-of-pocket costs except unpaid labour and equipment and building depreciation. These costs amounted to $591,085 per average greenhouse (8 540 square meter) or $69.21 per square meter.

Total Production Costs:

Average total production costs for cucumber producing greenhouses in Medicine Hat/Redcliff were estimated at $647,705. These costs were $75.84 per square meter. Details on the total production costs for greenhouse cucumber production are presented in Table 9. Figure 3 shows the relative proportion of all costs for greenhouse cucumber production for the 2010 crop year.

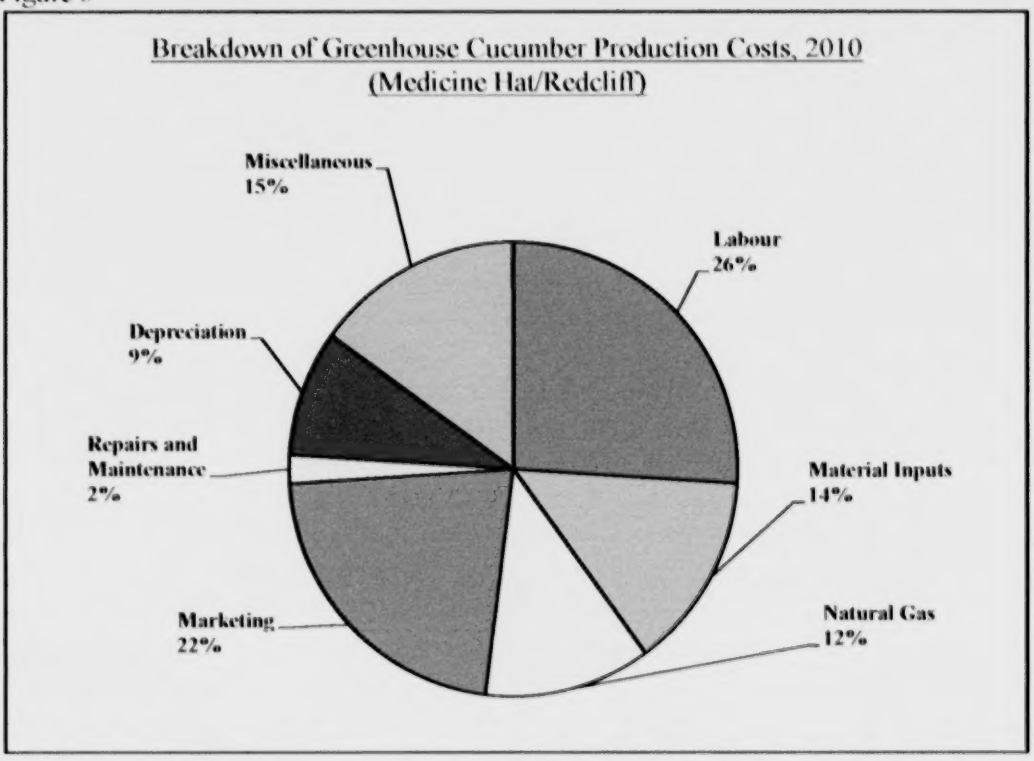
Management Indicators:

Gross Margin - when cash costs (D) were deducted from gross return (A-D), average greenhouse cucumber producer showed a positive gross margin of $134,644 ($15.77 per square meter). A positive gross margin indicates that the enterprise is economically feasible.

Average return to unpaid labour was positive and amounted to $78,024 per greenhouse producing cucumbers. In terms of per square meter it was negative at $9.14.

Average return to investment was positive at $134,644 per greenhouse ($15.77 per square meter). Average return to equity was also positive at $78,024 per greenhouse or $9.14 per square meter.

Figure 3



Investment for Greenhouses Producing Cucumbers in North-Central Alberta

Greenhouse investment data for cucumber production was obtained from three greenhouse operations in central Alberta. Average size of greenhouse area for cucumber producing greenhouses was 3 876 square meter. Average land area associated with these greenhouses was about 5.5 acres valued at $30,000 or $7.74 per square foot.

Average buildings investment for these greenhouses was reported at $193,917 or $50.03 per square meter. Machinery and equipment investment for these greenhouses amounted to $430,916 per greenhouse or $111.18 per square meter. A detailed breakdown of land, buildings, machinery and equipment investment are presented in Table 10. Total investment for cucumber producing greenhouses in north-central Alberta was estimated at $654,832 or $168.95 per square meter.

Table 10 **North-Central Alberta**

Average Investment for Cucumber Producing Greenhouses, 2010

Greenhouse Area: 3 876 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	30,000.00	7.74
Buildings	193,916.68	50.03
Machinery and Equipment	430,916.31	111.18
TOTAL INVESTMENT	**654,832.99**	**168.95**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**30,000.00**		
Greenhouse Buildings:	**193,916.68**	**13.0**	**7,583.33**
Equipment:			
Refrigeration/Freezer Storage	144.00	3.7	8.00
Warehouses/Storage Sheds	29,099.99	14.7	1,616.67
Fuel Tanks	1,343.99	12.3	74.67
Houses (25%)	27,067.50	19.0	1,503.75
Lighting	121,500.00	2.0	6,750.00
Heating System	156,774.31	9.0	8,709.68
Ventilation System	9,000.00	0.0	500.00
Humidity Control	9,630.00	13.0	535.00
Benches	0.00	2.0	0.00
Irrigation System	10,291.47	8.3	1,286.43
Water Pumps/Sand Filters	2,162.13	10.3	270.27
Soil Mixers/Flat Fillers/Seeding Lines	0.00	2.0	0.00
Generators	9,280.00	15.7	1,160.00
Roto-Tillers	149.33	4.7	18.67
Storage/Mixing Tanks	15,981.33	14.7	1,997.67
Sterilizers	0.00	0.0	0.00
Sprayers	549.33	8.7	68.67
Carts/Dollies	7,456.00	12.7	932.00
Fertilizer Injectors	4,044.00	16.7	505.50
Small Tools/Hardware	2,757.33	15.0	344.67
Sub-Total	**407,230.71**		**26,281.63**
Machinery and Vehicles			
Bobcat/Forklifts	2,178.13	14.0	272.27
Trucks	21,507.47	13.7	2,688.43
Other Machinery	0.00	0.0	0.00
Sub-Total	**23,685.60**		**2,960.70**

Greenhouse Production Costs and Returns for Cucumbers in North-Central Alberta

Gross Return:

Gross return (A) represents cucumber sales and some miscellaneous receipts (wage subsidy, dividend, etc.) for the 2010 crop. It amounted to $475,285 per average cucumber greenhouse with 3 824 square meter production area or $124.29 per square meter.

Variable Costs:

Variable costs (B) including unpaid labour amounted to $388,005 per greenhouse ($101.47 per square meter). The most significant cost items for greenhouse cucumber production were hired labour costs at $30.91 per square meter followed by marketing costs at $17.37, electricity at $9.11, natural gas at $7.50, fertilizer and chemicals at $6.89 per square meter. Detailed breakdown of all variable costs are presented in Table 11.

Capital Costs:

Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. Average total capital costs for a cucumber producing greenhouse was $52,341 or $13.69 per square meter. Over 70 percent of the capital cost was equipment and building depreciation.

Cash Costs:

Cash Costs (D) comprise of out-of-pocket costs incurred during cucumber production period. These costs were estimated at $400,615 per average cucumber producing greenhouse with a production area of 3 824 square meter. In terms of per square meter, these costs were $104.76.

Total Production Costs:

Average total production costs for cucumber producing greenhouse were calculated to be $440,346 or $115.15 per square meter for the 2010 crop year. The most significant cost items for cucumber production was hired labour costs at 27 percent, followed by marketing costs at 15 percent, electricity at eight (8) percent and natural gas at 7 percent. Details on various costs are presented in Table 9. Figure 4 presents the breakdown of major production costs for greenhouse cucumber production in north-central Alberta.

Management Indicators:

Management indicators in this report present data on gross margin, returns to unpaid labour, investment and equity. Gross margin (F) is based on gross return (A) less cash costs (D). For an average cucumber producing greenhouse, gross margin was significantly positive at $74,670 or $19.53 per square meter.

Average return to unpaid labour was positive at $37,845 per greenhouse or $9.90 per square meter. Average return to investment was estimated as positive at 10.9 percent. In terms of dollars per average greenhouse it was $71,764 or $18.77 per square meter. Average return to equity was also positive at $34,939 per cucumber producing greenhouse ($9.14 per square meter). Details on management indicators are presented in Table 11.

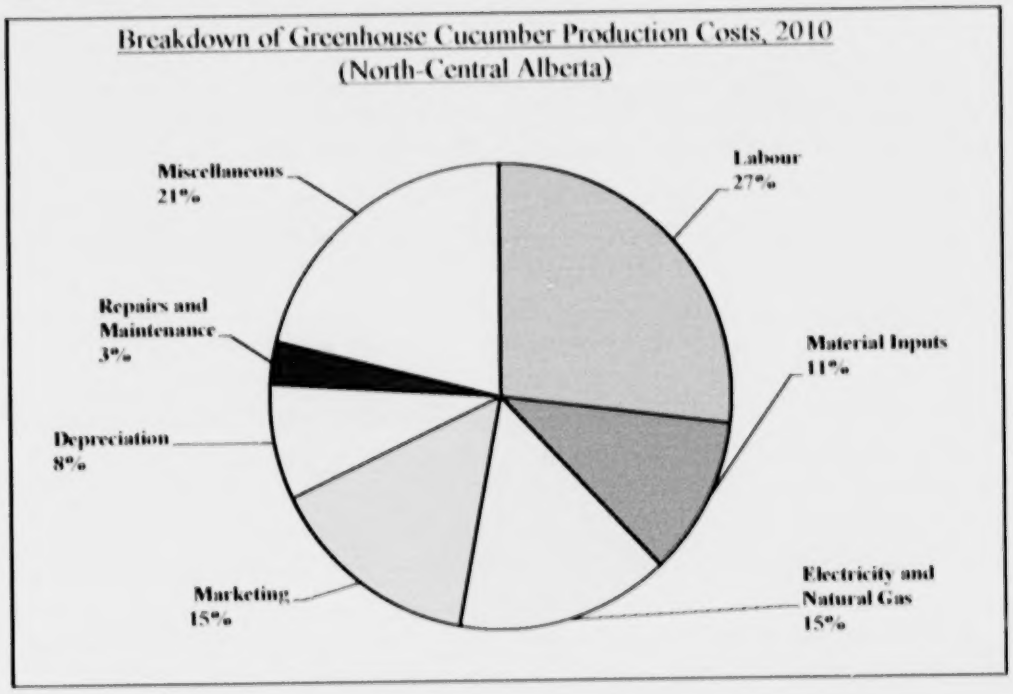
Production Costs and Returns for Cucumber Producing Greenhouses, 2010

Production Area: 3 824 sq. m.

Number of producers: 3

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			472,569.92	123.58
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			2,715.04	0.71
	GROSS RETURN			**475,284.96**	**124.29**
(B)					
	1. Growing Media, Seed/Cuttings			23,051.81	6.03
	2. Fertilizer and Chemicals			26,357.18	6.89
	3. Greenhouse Insurance			11,779.45	3.08
	4. Trays, Boxes and Other Packaging			0.00	0.00
	5. Freight and/or Trucking Costs			1,023.12	0.27
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			9,795.30	2.56
	7. Repairs - Buildings and Equipment			11,552.96	3.02
	8. Utilities: Natural Gas	0.00 GJ		28,667.48	7.50
	9. Electricity	0.00 KW		34,851.42	9.11
	10. Water	0.00 M^3		273.03	0.07
	11. Phone			1,209.15	0.32
	12. Custom Work and Specialized Labour			10,967.80	2.87
	13. Marketing Costs			66,425.17	17.37
	14. Assoc. Dues, Prof'l Fees and Promotion			4,473.46	1.17
	15. Small Tools, Supplies and Misc. Expenses			32,569.01	8.52
	16. Operating Interest Paid			1,621.00	0.42
	17. Labour Insurance/Benefits			2,291.78	0.60
	18. Hired Labour	6,841.67 hours		118,190.31	30.91
	19. Unpaid Labour	245.33 hours		2,905.65	0.76
	VARIABLE COSTS			**388,005.10**	**101.47**
(C)					
	1. Property/Business taxes			1,053.13	0.28
	2. Equipment and Building a) Depreciation			36,825.12	9.63
	b) Lease Payments			2,409.12	0.63
	3. Paid Capital Interest			12,053.60	3.15
	TOTAL CAPITAL COSTS			**52,340.97**	**13.69**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**400,615.31**	**104.76**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**440,346.08**	**115.15**
(F)	**GROSS MARGIN**	**(A-D)**		**74,669.65**	**19.53**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**37,844.53**	**9.90**
	RETURN TO INVESTMENT	**(A-E+C2a)**	10.9%	**71,764.00**	**18.77**
	RETURN TO EQUITY	**(A-E)**		**34,938.88**	**9.14**

Figure 4


Breakdown of Greenhouse Cucumber Production Costs, 2010
(North-Central Alberta)
Labour
27%
Material Inputs
11%
Electricity and
Natural Gas
15%
Marketing
15%
Depreciation
8%
Repairs and
Maintenance
3%
Miscellaneous
21%

SECTION V

Greenhouse Production Costs and Returns for Tomatoes

Greenhouse tomato production has more than doubled during the last decade. The greenhouse area under tomato production was 196 859 square meter or just about 20 hectares in 2010. It represents over 16 percent of the greenhouse area in Alberta. The number of greenhouse operations producing tomatoes was reported at 126 in the 2010 survey of this industry.

Data on the greenhouse production costs and returns for tomatoes was obtained from six (6) greenhouse operations across the province. Although the sample size for tomato production costs and returns was relatively small, information presented in the following two tables can be used for guideline purposes. Six greenhouses were further divided into two groups, i.e. Medicine Hat/Redcliff (3) and north central Alberta (3) for cost comparison purposes.

Investment for Greenhouses Producing Tomatoes in Medicine Hat/Redcliff

Greenhouse investment data for tomato production was obtained from three greenhouse operations from the Medicine Hat/Redcliff area. Average size of greenhouse area for tomato producing greenhouses was 17 488 square meter. Average land area associated with these greenhouses was about twelve acres valued at $64,167 or $3.67 per square meter.

Buildings investment for tomato producing greenhouses was reported at $1,141,125 or $65.25 per square meter. Machinery and equipment investment for these greenhouses amounted to $830,743 per greenhouse or $47.50 per square meter. A detailed breakdown of land, buildings, machinery and equipment investment are presented in Table 12. Total investment for tomato producing greenhouses was estimated at $2,036,034 or $116.42 per square meter.

Greenhouse Production Costs and Returns for Tomatoes in Medicine Hat/Redcliff

Gross Return:

Gross return (A) represents tomato sales and some miscellaneous receipts (wage subsidy, dividend, etc.) during the 2010 crop year. It amounted to $1,374,061 per average tomato greenhouse with 12 670 square meter production area or $108.45 per square meter.

Variable Costs:

Variable costs (B) including unpaid labour amounted to $1,074,897 per greenhouse or $84.84 per square meter. The most significant cost items for greenhouse tomato production were hired labour costs at $27.92 per square meter followed by marketing costs at $23.85 and natural gas costs at $12.07 per square meter. Detailed breakdown of all variable costs are presented in Table 13.

Table 12 **Medicine Hat/Redcliff**

Average Investment for Tomato Producing Greenhouses, 2010

Greenhouse Area: 17 488 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	64,166.67	3.67
Buildings	1,141,125.00	65.25
Machinery and Equipment	830,742.65	47.50
TOTAL INVESTMENT	**2,036,034.32**	**116.42**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**64,166.67**		
Greenhouse Buildings:	**1,141,125.00**	**9.0**	**44,625.00**
Equipment:			
Refrigeration/Freezer Storage	0.00	2.0	0.00
Warehouses/Storage Sheds	0.00	2.0	0.00
Fuel Tanks	0.00	2.0	0.00
Houses (25%)	60,000.01	17.0	3,333.33
Lighting	0.00	2.0	0.00
Heating System	403,499.99	8.3	22,416.67
Ventilation System	142,499.99	9.0	7,916.67
Humidity Control	29,999.99	9.0	1,666.67
Benches	19,500.01	3.3	1,083.33
Irrigation System	14,666.67	7.7	1,833.33
Water Pumps/Sand Filters	4,133.33	8.0	516.67
Soil Mixers/Flat Fillers/Seeding Lines	0.00	2.0	0.00
Generators	14,133.33	10.3	1,766.67
Roto-Tillers	0.00	2.0	0.00
Storage/Mixing Tanks	2,933.33	9.7	366.67
Sterilizers	0.00	0.0	0.00
Sprayers	4,400.00	5.7	550.00
Carts/Dollies	62,666.67	9.7	7,833.33
Fertilizer Injectors	6,933.33	8.7	866.67
Small Tools/Hardware	19,200.00	6.0	2,400.00
Sub-Total	**784,566.65**		**52,550.01**
Machinery and Vehicles			
Bobcats/Forklifts	16,266.67	13.0	2,033.33
Trucks	29,909.33	19.2	3,738.67
Other Machinery	0.00	2.0	0.00
Sub-Total	**46,176.00**		**5,772.00**

Production Costs and Returns for Tomato Producing Greenhouses, 2010

Production Area: 12 670 sq. m.

Number of producers: 3

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			1,315,779.50	103.85
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			58,282.00	4.60
	GROSS RETURN			**1,374,061.50**	**108.45**
(B)					
	1. Growing Media, Seed/Cuttings			66,877.61	5.28
	2. Fertilizer and Chemicals			50,024.54	3.95
	3. Greenhouse Insurance			14,199.85	1.12
	4. Trays, Boxes and Other Packaging			0.00	0.00
	5. Freight and/or Trucking Costs			0.00	0.00
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			12,936.10	1.02
	7. Repairs - Buildings and Equipment			16,357.81	1.29
	8. Utilities: Natural Gas	0.00 GJ		152,989.79	12.07
	9. Electricity	0.00 KW		18,823.99	1.49
	10. Water	0.00 M^3		11,157.02	0.88
	11. Phone			2,155.33	0.17
	12. Custom Work and Specialized Labour			1,095.96	0.09
	13. Marketing Costs			302,127.09	23.85
	14. Assoc. Dues, Prof'l Fees and Promotion			15,529.57	1.23
	15. Small Tools, Supplies and Misc. Expenses			37,845.47	2.99
	16. Operating Interest Paid			697.55	0.06
	17. Labour Insurance/Benefits			3,424.88	0.27
	18. Hired Labour	22,237.53 hours		353,721.90	27.92
	19. Unpaid Labour	1,733.33 hours		14,932.49	1.18
	VARIABLE COSTS			**1,074,896.95**	**84.84**
(C)					
	1. Property/Business taxes			17,749.81	1.40
	2. Equipment and Building a) Depreciation			103,007.10	8.13
	b) Lease Payments			2,280.60	0.18
	3. Paid Capital Interest			22,251.73	1.76
	TOTAL CAPITAL COSTS			**145,289.24**	**11.47**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**1,102,246.60**	**87.00**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**1,220,186.19**	**96.31**
(F)	**GROSS MARGIN**	**(A-D)**		**271,814.90**	**21.45**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**168,807.80**	**13.32**
	RETURN TO INVESTMENT	**(A-E+C2a)**	12.6%	**256,882.41**	**20.27**
	RETURN TO EQUITY	**(A-E)**		**153,875.31**	**12.14**

Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. The average total capital costs for a tomato-producing greenhouse was $145,289 or $11.47 per square meter. Almost two-third of the capital cost was equipment and building depreciation.

Cash Costs:

Cash Costs (D) comprise of out-of-pocket costs incurred during the tomato production period. These costs were estimated at $1,102,247 per average tomato producing greenhouse with a production area of 12 670 square meter. In terms of per square meter, these costs were $87.00.

Total Production Costs:

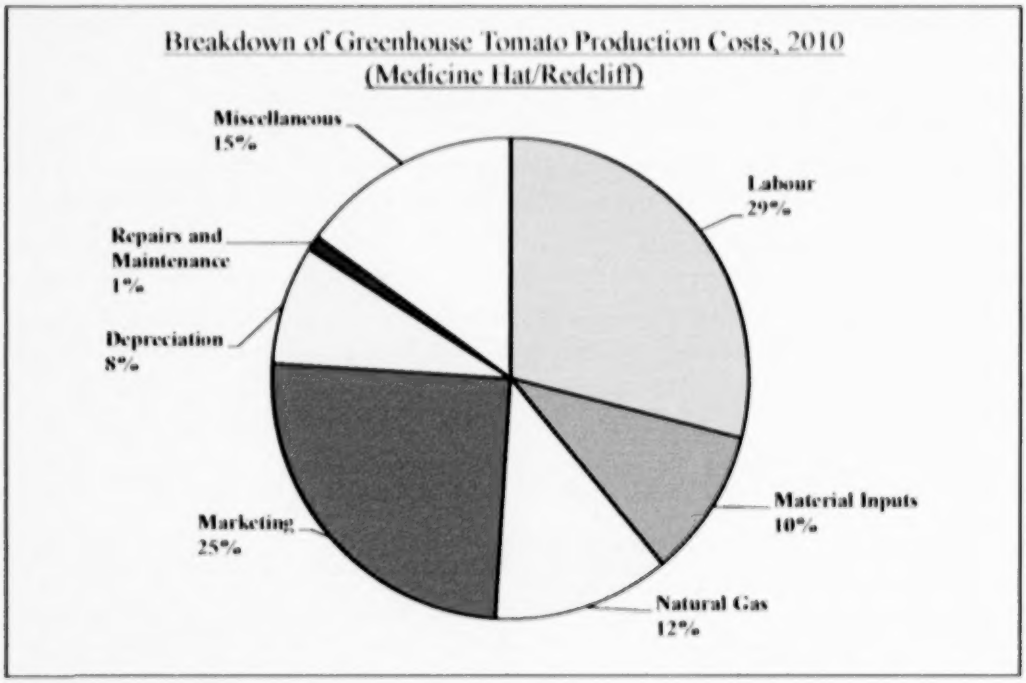
Average total production costs for tomato producing greenhouses in the Medicine Hat/Redcliff area were calculated to be $1,220,186 or $96.31 per square meter for the 2010 crop year. The most significant cost items for tomato production was hired labour costs at 29 percent, followed by marketing costs at 25 percent and natural gas costs at 12 percent. Details on various costs are presented in Table 13. Figure 5 presents the breakdown of major production costs for greenhouse tomato production in Medicine Hat/Redcliff area.

Management Indicators:

Management indicators in this report present data on gross margin, returns to unpaid labour, investment and equity. Gross margin (F) is based on gross return (A) less cash costs (D). For an average tomato-producing greenhouse in Medicine Hat/Redcliff, gross margin was positive at $271,815 or $21.45 per square meter.

Average return to unpaid labour was positive at $168,808 per greenhouse or $13.32 per square meter. Average return to investment was estimated at 12.6 percent. In terms of dollars per greenhouse it was $256,882 or $20.27 per square meter. Average return to equity was positive at $153,875 per tomato-producing greenhouse or $12.14 per square meter. Details on management indicators are presented in Table 13.

Figure 5



Investment for Greenhouses Producing Tomatoes in North-Central Alberta

Greenhouse investment data for tomato production in north-central Alberta was obtained from three greenhouse operations across the province. Average size of greenhouse area for tomato producing greenhouses was 11 293 square meter. Average land area associated with these greenhouses was over twelve acres valued at $69,167 or $6.12 per square meter.

Buildings investment for tomato producing greenhouses was reported at $401,203 or $35.53 per square meter. Machinery and equipment investment for these greenhouses amounted to $777,260 per greenhouse or $68.83 per square meter. A detailed breakdown of land, buildings, machinery and equipment investment are presented in Table 14. Total investment for tomato producing greenhouses was estimated at $1,247,630 or $110.48 per square meter.

Greenhouse Production Costs and Returns for Tomatoes in North-Central Alberta

Gross Return:

Gross return (A) represents tomato sales and some miscellaneous receipts (wage subsidy, dividend, etc.) for the 2010 crop. It amounted to $1,146,183 per average tomato greenhouse with 10 717 square meter production area or $106.95 per square meter.

Table 14 **North-Central Alberta**

Average Investment for Tomato Producing Greenhouses, 2010

Greenhouse Area: 11 293 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	69,166.67	6.12
Buildings	401,203.44	35.53
Machinery and Equipment	777,260.00	68.83
TOTAL INVESTMENT	**1,247,630.11**	**110.48**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**69,166.67**		
Greenhouse Buildings:	**401,203.44**	**12.0**	**15,689.52**
Equipment:			
Refrigeration/Freezer Storage	657.00	3.7	36.50
Warehouses/Storage Sheds	19,424.99	7.3	1,079.17
Fuel Tanks	807.01	12.0	44.83
Houses (25%)	66,187.51	25.0	3,677.08
Lighting	0.00	2.0	0.00
Heating System	383,092.49	10.7	21,282.92
Ventilation System	6,000.01	0.0	333.33
Humidity Control	26,475.01	9.3	1,470.83
Benches	0.00	2.0	0.00
Irrigation System	19,893.33	7.0	2,486.67
Water Pumps/Sand Filters	1,960.00	11.0	245.00
Soil Mixers/Flat Fillers/Seeding Lines	0.00	2.0	0.00
Generators	13,840.00	15.7	1,730.00
Roto-Tillers	1,348.00	7.3	168.50
Storage/Mixing Tanks	11,973.33	8.7	1,496.67
Sterilizers	10,666.67	0.0	1,333.33
Sprayers	681.33	7.0	85.17
Carts/Dollies	51,573.33	10.0	6,446.67
Fertilizer Injectors	5,840.00	7.0	730.00
Small Tools/Hardware	9,840.00	10.0	1,230.00
Sub-Total	**630,260.01**		**43,876.67**
Machinery and Vehicles			
Bobcats/Forklifts	11,893.33	13.3	1,486.67
Trucks	121,773.33	12.2	15,221.67
Other Machinery	13,333.33	4.0	1,666.67
Sub-Total	**146,999.99**		**18,375.01**

Variable Costs:

Variable costs (B) including unpaid labour amounted to $835,521 per greenhouse or $77.96 per square meter. The most significant cost items for greenhouse tomato production were hired labour costs at $28.86 per square meter followed by marketing costs at $18.29, natural gas at $8.72 and growing media and seedling at $6.62 per square meter. Detailed breakdown of all variable costs are presented in Table 15.

Capital Costs:

Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. The average total capital costs for a tomato-producing greenhouse was $109,561 or $10.22 per square meter. Almost more than half of the capital cost was equipment and building depreciation.

Cash Costs:

Cash Costs (D) comprise of out-of-pocket costs incurred during the tomato production period. These costs were estimated at $867,170 per average tomato producing greenhouse with a production area of 10,717 square meter. In terms of per square meter, these costs were $80.92.

Total Production Costs:

Average total production costs for tomato producing greenhouse in north-central Alberta were calculated to be $945,083 or $88.19 per square meter for the 2010 crop year. The most significant cost items for tomato production was labour costs at 33 percent, followed by marketing costs at 21 percent and natural gas at 10 percent. Details on various costs are presented in Table 15. Figure 6 presents the breakdown of major production costs for greenhouse tomato production in north-central Alberta.

Management Indicators:

Management indicators in this report present data on gross margin, returns to unpaid labour, investment and equity. Gross margin (F) is based on gross return (A) less cash costs (D). For an average tomato-producing greenhouse, gross margin was positive at $279,013 or $26.03 per square meter.

Average return to unpaid labour was positive at $201,101 per greenhouse or $18.76 per square meter. Average return to investment was estimated at 22.4 percent. In terms of dollars per greenhouse it was $279,013 or $26.30 per square meter. Average return to equity was positive at $201,101 per tomato-producing greenhouse or $18.76 per square meter. Details on management indicators are presented in Table 15.

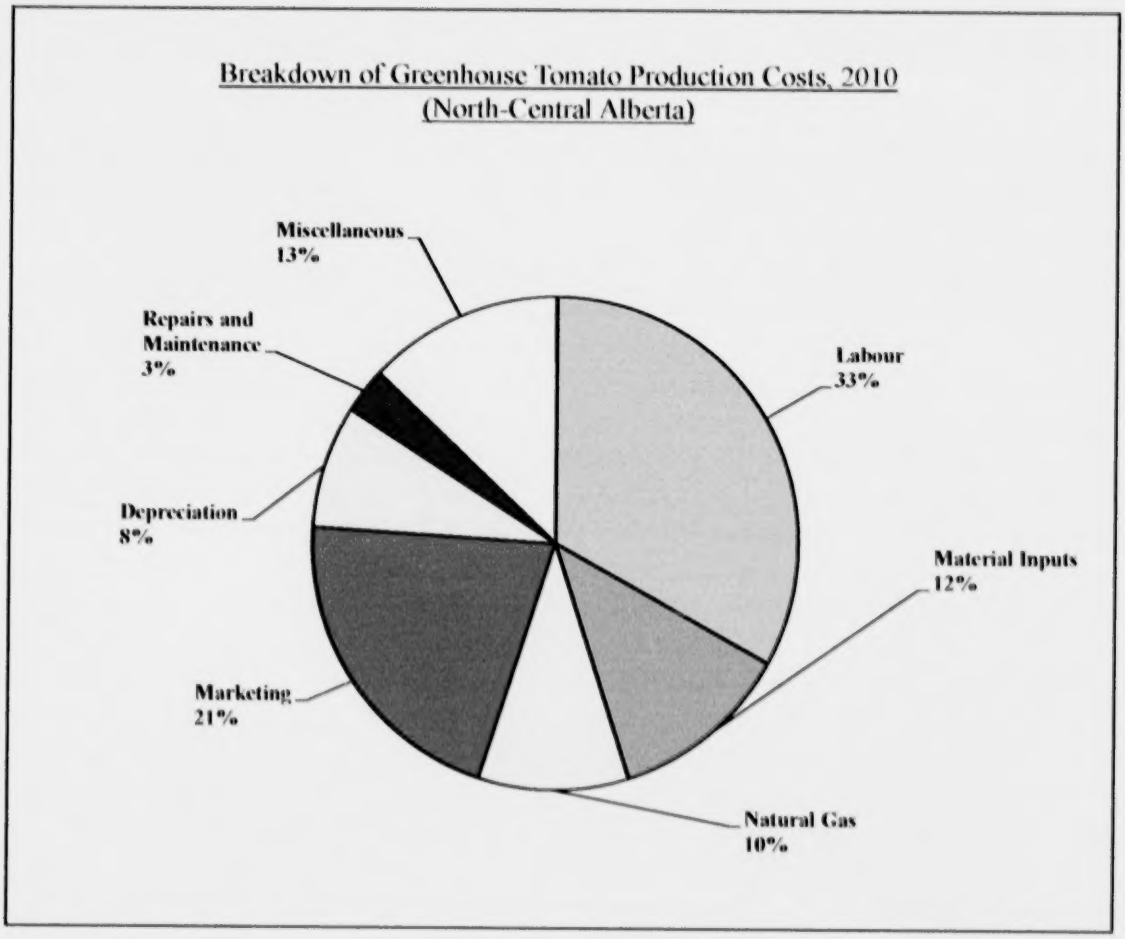
Production Costs and Returns for Tomato Producing Greenhouses, 2010

Production Area: 10 717 sq. m.

Number of producers: 3

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			1,131,715.20	105.60
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			14,467.95	1.35
	GROSS RETURN			**1,146,183.15**	**106.95**
(B)					
	1. Growing Media, Seed/Cuttings			70,930.32	6.62
	2. Fertilizer and Chemicals			40,387.21	3.77
	3. Greenhouse Insurance			19,196.20	1.79
	4. Trays, Boxes and Other Packaging			0.00	0.00
	5. Freight and/or Trucking Costs			0.00	0.00
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			13,146.24	1.23
	7. Repairs - Buildings and Equipment			28,012.96	2.61
	8. Utilities: Natural Gas	0.00 GJ		93,492.56	8.72
	9. Electricity	0.00 KW		14,161.74	1.32
	10. Water	0.00 M^3		7,935.86	0.74
	11. Phone			2,573.79	0.24
	12. Custom Work and Specialized Labour			10,197.30	0.95
	13. Marketing Costs			196,037.18	18.29
	14. Assoc. Dues, Prof'l Fees and Promotion			14,103.68	1.32
	15. Small Tools, Supplies and Misc. Expenses			8,551.11	0.80
	16. Operating Interest Paid			2,301.09	0.21
	17. Labour Insurance/Benefits			5,214.53	0.49
	18. Hired Labour	28,048.67	hours	309,279.33	28.86
	19. Unpaid Labour	0.00	hours	0.00	0.00
	VARIABLE COSTS			**835,521.10**	**77.96**
(C)					
	1. Property/Business taxes			11,367.58	1.06
	2. Equipment and Building a) Depreciation			77,912.59	7.27
	b) Lease Payments			4,822.65	0.45
	3. Paid Capital Interest			15,458.63	1.44
	TOTAL CAPITAL COSTS			**109,561.45**	**10.22**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**867,169.96**	**80.92**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**945,082.55**	**88.19**
(F)	**GROSS MARGIN**	**(A-D)**		**279,013.19**	**26.03**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**201,100.60**	**18.76**
	RETURN TO INVESTMENT	**(A-E+C2a)**	22.4%	**279,013.19**	**26.03**
	RETURN TO EQUITY	**(A-E)**		**201,100.60**	**18.76**

Figure 6


Breakdown of Greenhouse Tomato Production Costs, 2010
(North-Central Alberta)
Miscellaneous
13%
Repairs and
Maintenance
3%
Depreciation
8%
Marketing
21%
Labour
33%
Material Inputs
12%
Natural Gas
10%

SECTION VI

Greenhouse Production Costs and Returns for Peppers

Greenhouse pepper production in Alberta has increased significantly during the last ten to twelve years. At the start of the nineties there were very few greenhouse operations that produced peppers. The 2003 greenhouse industry survey reported 28 operations producing peppers. A survey of the industry in 2010 reported 69 pepper growers across the province, an increase of 146 percent over 2003. Greenhouse pepper production represents six percent of the total greenhouse area in the province and about 12 percent of the area under vegetables.

Investment and production costs and returns presented in Tables 16 and 17 were obtained from seven greenhouse operations in Alberta. Two pepper producing greenhouse operations provided data from north central Alberta. Data obtained from these two operations was not analyzed to develop group averages in order to preserve confidentiality of the study participants. Data was collected during the winter and spring of 2009 on peppers produced in 2008. As mentioned earlier in the report, data for the 2008 crops was up-dated to 2010 by using farm input price indexes (FIPIs) and prices obtained from greenhouse operators.

Investment for Greenhouses Producing Peppers

Greenhouse investment data was obtained from five pepper producing greenhouse operations in the Medicine Hat/Redcliff area. Each operator was asked to value the greenhouse structure based on the current market costs of replacement. In order to calculate depreciation of buildings, machinery and equipment, they were also asked to provide an estimate on life of the structure and equipment.

Average land area associated with greenhouses producing peppers was just over thirteen acres. It was valued at $71,980 or $6.08 per square meter. Average greenhouse area for pepper production was reported at 11 841 square meter for the 2010 crop year.

Buildings investment for pepper producing greenhouses was reported at $912,363 per greenhouse or $77.05 per square meter. Machinery and equipment investment for this greenhouse was estimated at $697,442 or $58.90 per square meter. When land, buildings, machinery and equipment investments were combined, total investment for pepper producing greenhouses amounted to $1,681,785 or $142.03 per square meter of greenhouse area. Details on land, buildings, machinery and equipment investments are provided in Table 16.

Greenhouse Production Costs and Returns for Peppers

Gross Return:

Gross return (A) represents total value of pepper sales during the crop year. Gross return from an average greenhouse producing peppers including miscellaneous receipts was $932,546 or $94.13 per square meter (Table 17). The average size of the greenhouse was 9 907 per square meter. Among the three major greenhouse vegetables (cucumbers, tomatoes and peppers), peppers showed the second highest return per square meter.

Table 16 **Medicine Hat/Redcliff**

Average Investment for Pepper Producing Greenhouses, 2010

Greenhouse Area: 11 841 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	71,980.00	6.08
Buildings	912,363.00	77.05
Machinery and Equipment	697,442.50	58.90
TOTAL INVESTMENT	**1,681,785.50**	**142.03**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**71,980.00**		
Greenhouse Buildings:	**912,363.00**	**11.6**	**35,679.00**
Equipment:			
Refrigeration/Freezer Storage	59.40	3.0	3.30
Warehouses/Storage Sheds	1,485.00	5.0	82.50
Fuel Tanks	509.40	7.2	28.30
Houses (25%)	41,062.50	30.6	2,281.25
Lighting	0.00	2.0	0.00
Heating System	376,200.00	11.8	20,900.00
Ventilation System	54,000.00	0.0	3,000.00
Humidity Control	22,995.00	9.6	1,277.50
Benches	0.00	2.0	0.00
Irrigation System	28,672.00	7.4	3,584.00
Water Pump/Sand Filters	13,592.00	9.0	1,699.00
Soil Mixer/Flat Fillers/Seeding Lines	0.00	2.0	0.00
Generators	9,488.00	16.4	1,186.00
Roto-Tillers	61.60	3.6	7.70
Storage/Mixing Tanks	7,808.00	9.4	976.00
Sterilizers	0.00	0.0	0.00
Sprayers	2,981.60	7.6	372.70
Carts/Dollies	69,408.00	8.6	8,676.00
Fertilizer Injectors	2,208.00	9.2	276.00
Small Tools/Hardware	10,608.00	8.2	1,326.00
Sub-Total	**641,138.50**		**45,676.25**
Machinery and Vehicles			
Bobcats/Forklifts	8,512.00	16.8	1,064.00
Trucks	31,792.00	11.7	3,974.00
Other Machinery	16,000.00	3.0	2,000.00
Sub-Total	**56,304.00**		**7,038.00**

Production Costs and Returns for Pepper Producing Greenhouses, 2010

Production Area: 9 907 sq. m.

Number of producers: 5

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			906,787.71	91.53
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			25,758.20	2.60
	GROSS RETURN			**932,545.91**	**94.13**
(B)					
	1. Growing Media, Seed/Cuttings			84,013.89	8.48
	2. Fertilizer and Chemicals			22,474.51	2.27
	3. Greenhouse Insurance			14,275.58	1.44
	4. Trays, Boxes and Other Packaging			0.00	0.00
	5. Freight and/or Trucking Costs			0.00	0.00
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			8,514.12	0.86
	7. Repairs - Buildings and Equipment			14,363.21	1.45
	8. Utilities: Natural Gas	0.00 GJ		108,911.21	10.99
	9. Electricity	0.00 KW		13,091.39	1.32
	10. Water	0.00 M^3		6,146.43	0.62
	11. Phone			2,874.94	0.29
	12. Custom Work and Specialized Labour			3,106.48	0.31
	13. Marketing Costs			127,290.56	12.85
	14. Assoc. Dues, Prof'l Fees and Promotion			8,436.17	0.85
	15. Small Tools, Supplies and Misc. Expenses			19,255.30	1.94
	16. Operating Interest Paid			7,254.21	0.73
	17. Labour Insurance/Benefits			6,641.45	0.67
	18. Hired Labour	14,776.60	hours	207,491.77	20.94
	19. Unpaid Labour	0.00	hours	0.00	0.00
	VARIABLE COSTS			**654,141.23**	**66.03**
(C)					
	1. Property/Business taxes			4,956.80	0.50
	2. Equipment and Building a) Depreciation			88,370.40	8.92
	b) Lease Payments			891.63	0.09
	3. Paid Capital Interest			10,799.51	1.09
	TOTAL CAPITAL COSTS			**105,018.37**	**10.60**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**670,789.16**	**67.71**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**759,159.60**	**76.63**
(F)	**GROSS MARGIN**	**(A-D)**		**261,756.75**	**26.42**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**173,386.31**	**17.50**
	RETURN TO INVESTMENT	**(A-E+C2a)**	15.6%	**261,756.75**	**26.42**
	RETURN TO EQUITY	**(A-E)**		**173,386.31**	**17.50**

Variable Costs:

Variable costs (B) for greenhouses producing peppers amounted to $654,141 or $66.03 per square meter. Among all the costs, labour was the highest at $20.94, followed closely by and natural gas at $10.99 and marketing costs at $12.85 per square meter. Meanwhile, other significant costs were growing media and seed, fertilizer and chemicals, small tools, supplies and miscellaneous expenses and repairs. A detailed breakdown of these costs is presented in Table 17.

Capital Costs:

Capital costs (C) were made up of property/business taxes, equipment and building depreciation and paid capital interest. Average total capital cost per greenhouse producing peppers amounted to $105,018 or $10.60 per square meters.

Cash Costs:

Cash costs (D) represent all costs incurred during the crop production period less unpaid labour, equipment and building depreciation. These costs were estimated at $670,789 per average greenhouse or $67.71 per square meter for pepper production.

Total Production Costs:

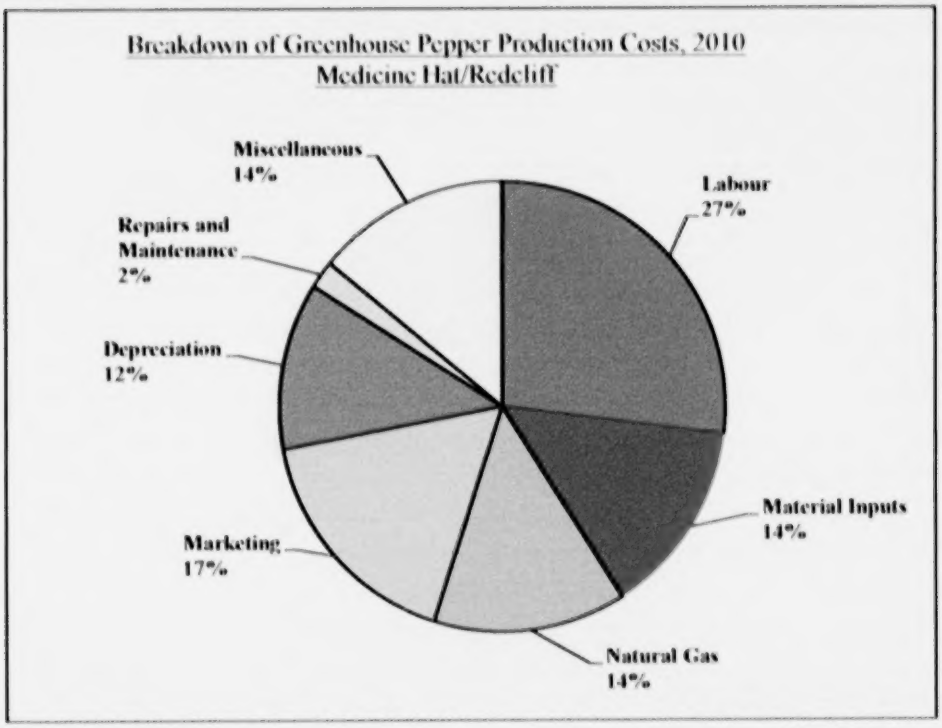
Average total production costs for pepper producing greenhouses amounted to $759,160 or $76.63 per square meter. Average size of the greenhouse producing peppers was 9,907 per square meter. Details on total production costs are presented in Table 17. Figure 7 shows a breakdown of major production costs for greenhouse pepper production.

Management Indicators:

Gross margin (F) when cash costs (D) were deducted from gross return (A), average greenhouse producing peppers showed a positive gross margin of $261,757 or $26.42 per square meter. Among the greenhouse producing vegetable crops, peppers showed relatively lower gross margin per square meter.

Average return to unpaid labour for peppers was estimated at $173,386 per greenhouse or $17.50 per square meter. Average return to investment was calculated at 15.6 percent. Return to investment for a pepper producing greenhouse was $261,756 or $26.42 per square meter. Average return to equity was positive at $173,386 per greenhouse or $17.50 per square meter. Details on management indicators are presented in Table 17.

Figure 7


Breakdown of Greenhouse Pepper Production Costs, 2010
Medicine Hat/Redcliff
Miscellaneous 14%
Labour 27%
Repairs and Maintenance 2%
Depreciation 12%
Material Inputs 14%
Marketing 17%
Natural Gas 14%

SECTION VII

Greenhouse Production Costs and Returns for Bedding Plants/Ornamentals

Greenhouse bedding plants production in Alberta has been increasing steadily over the years despite competition from cheap imports from British Columbia and south of the border. During the 2010 greenhouse industry survey, the area under greenhouse bedding plants was estimated at 386 843 square meter or 32 percent of the total greenhouse area in the province. Number of greenhouse operations producing bedding plants was reported around 75.

Greenhouse production of potted flowers and ornamentals was estimated at 56 479 square meter or about five percent of the greenhouse area in Alberta in 2010. When this area was combined with the area under greenhouse bedding plants and cut flowers, total area under these crops was 428 093 square meter. It represented about 35 percent of the greenhouse area in Alberta.

Investment and production costs and returns data presented in Tables 18 and 19 were obtained from five greenhouse operations across the province. Although the sample size for the group of greenhouse operations was relatively small, yet the results should be considered as useful guidelines for information and planning purposes.

Investment for Greenhouses Producing Bedding Plants/Ornamentals

Greenhouse investment data was obtained directly from study participants through personal survey. Each operator was asked to value the greenhouse structure based on the current market costs of replacement. They were also asked to provide an estimate on life of the structure to calculate depreciation costs for buildings and equipment.

Average land area associated with greenhouse operations producing bedding plants and ornamentals was around four acres. Land was valued at $5,500 per acre. Total land cost was estimated at $20,960 per average greenhouse area of 2 946 square meter or $7.11 per square meter.

Building investment for the above sized greenhouse amounted to $168,848 or $57.31 per square meter. Machinery and equipment investment was estimated at $193,573 per average greenhouse or $65.71 per square meter. A detailed breakdown of land, buildings, machinery and equipment investment is presented in Table 18. Total investment amounted to $383,381 per average greenhouse operation producing bedding plants and ornamentals. In terms of dollars per square meter investment was estimated at $130.13.

Average Investment for Bedding Plant/Ornamental Greenhouses, 2010

Greenhouse Area: 2 946 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	20,960.00	7.11
Buildings	168,848.00	57.31
Machinery and Equipment	193,573.00	65.71
TOTAL INVESTMENT	**383,381.00**	**130.13**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**20,960.00**		
Greenhouse Buildings:	**183,530.00**	**14.2**	**6,423.55**
Equipment:			
Refrigeration/Freezer Storage	0.00	0.0	0.00
Warehouses/Storage Sheds	30,200.00	14.4	1,510.00
Fuel Tanks	208.00	3.0	10.40
Houses (25%)	45,545.00	25.2	2,277.25
Other Buildings	10,600.00	10.6	530.00
Lighting	630.00	1.0	31.50
Heating System	50,260.00	8.2	2,513.00
Ventilation System	0.00	0.0	0.00
Humidity Control	0.00	0.0	0.00
Benches	11,460.00	7.8	573.00
Irrigation System	5,939.00	11.6	593.00
Water Pumps/Sand Filters	2,750.00	3.6	275.00
Soil Mixers/Flat Fillers/Seeding Lines	4,074.00	37.0	407.40
Generators	4,812.00	20.2	481.20
Roto-Tillers	2,425.00	3.8	242.50
Storage/Mixing Tanks	1,560.00	5.6	156.00
Sterilizers	50.00	3.0	5.00
Sprayers	980.00	5.8	98.00
Carts/Dollies	3,634.00	5.2	363.40
Fertilizer Injectors	3,495.00	3.4	349.50
Small Tools/Hardware	2,879.00	5.4	287.90
Sub-Total	**181,501.00**		**10,704.95**
Machinery and Vehicles			
Bobcats/Forklifts	9,135.00	6.4	913.50
Trucks	15,293.00	11.6	1,529.30
Other Machinery	0.00	0.0	0.00
Sub-Total	**24,428.00**		**2,442.80**

Greenhouse Production Costs and Returns for Bedding Plants/Ornamentals

Gross Return:

Gross return (A) represents sales of bedding plants/ornamentals during the 2010 crop production year. For a greenhouse with a production area of 2 844 square meter gross return including miscellaneous receipts was calculated at $369,407 per average greenhouse or $129.89 per square meter.

Variable Costs:

Variable costs (B) represent all out-of-pocket costs including unpaid labour. These costs were estimated at $218,064 per average greenhouse of 2 844 square meter. In terms of dollars per square meter, average variable costs were $76.70 square meter. The most significant cost items were hired labour at $26.92 per square meter, followed by growing media, seed/cuttings at $15.54 and unpaid labour costs at $5.95 per square meter. Details on all variable cost items are presented in Table 19.

Capital Costs:

Capital costs (C) include property/business taxes, equipment and building depreciation and actual interest paid on capital. These costs were estimated at $23,947.75 per average greenhouse or $10.68 per square meter.

Cash Costs:

Cash costs (D) represent all out-of-pocket costs incurred during the bedding plants/ornamentals production. These amounted to $211,951 per greenhouse with an average area of 2 844 per square meter or $74.54 per square meter.

Total Production Costs:

Average total production costs (E) for bedding plants/ornamentals producing greenhouses were calculated at $242,012. These were $87.37 per square meter based on greenhouse production area. Detailed breakdowns of various cost items are given in Table 19. Figure 8 shows the relative proportion of all production costs for greenhouse bedding plants/ornamentals.

Management Indicators:

Gross margin (F) is equal to gross return (A) less cash costs (D). It was calculated at $157,456 for an average greenhouse producing bedding plants/ornamentals. In terms of per square meter, gross margin was $55.35. It was the highest gross margin recorded when compared with other greenhouse crops.

Average return to unpaid labour for these greenhouses was $144,308 or $48.47 per square meter for bedding plants/ornamentals produced in 2010. Again return per square meter was the highest for greenhouse operations producing bedding plants/ornamental.

Production Costs and Returns for Bedding Plant/Ornamental Greenhouses, 2010

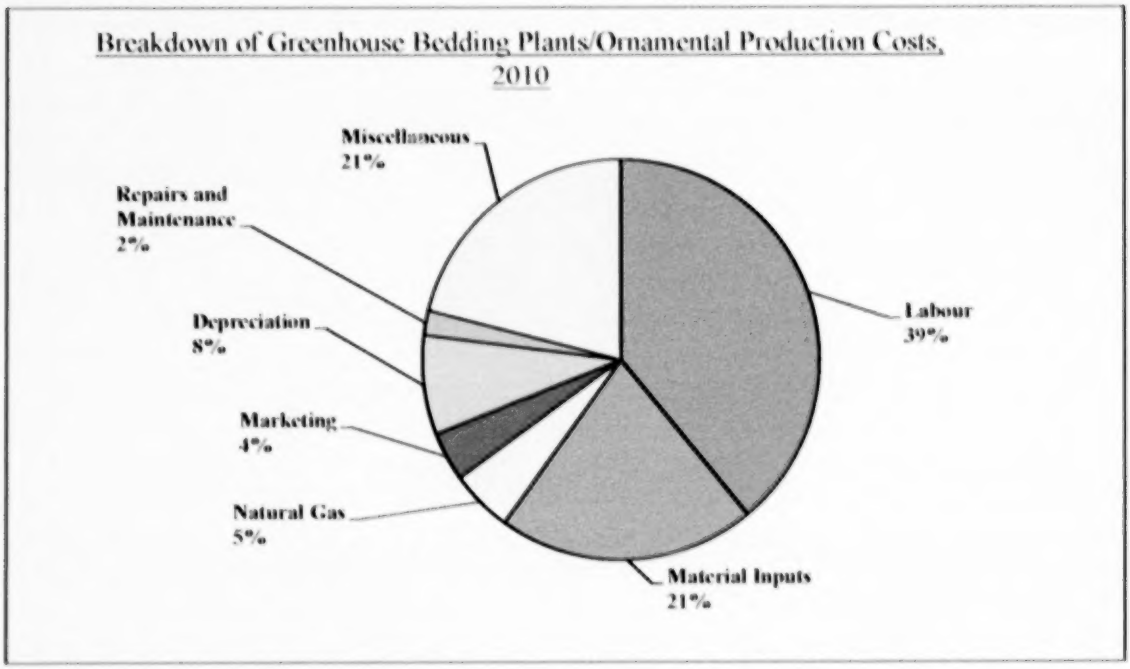
Production Area: 2 844 sq. m.

Number of producers: 5

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			363,406.32	127.78
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			6,000.84	2.11
	GROSS RETURN			**369,407.16**	**129.89**
(B)					
	1. Growing Media, Seed/Cuttings			44,191.81	15.54
	2. Fertilizer and Chemicals			3,049.60	1.07
	3. Greenhouse Insurance			3,528.91	1.27
	4. Trays, Boxes and Other Packaging			13,557.20	4.77
	5. Freight and/or Trucking Costs			2,921.34	1.03
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			6,455.06	2.27
	7. Repairs - Buildings and Equipment			5,628.08	1.98
	8. Utilities: Natural Gas	0.00 GJ		12,405.19	4.36
	9. Electricity	0.00 KW		6,033.34	2.12
	10. Water	0.00 M^3		986.06	0.35
	11. Phone			1,280.65	0.45
	12. Custom Work and Specialized Labour			553.52	0.19
	13. Marketing Costs			986.06	0.35
	14. Assoc. Dues, Prof'l Fees and Promotion			13,089.57	4.61
	15. Small Tools, Supplies and Misc. Expenses			2,647.44	0.93
	16. Operating Interest Paid			2,317.33	0.81
	17. Labour Insurance/Benefits			4,920.15	1.73
	18. Hired Labour	14,776.60 hours		76,569.89	26.92
	19. Unpaid Labour	0.00 hours		16,913.03	5.95
	VARIABLE COSTS			**218,064.22**	**76.68**
(C)					
	1. Property/Business taxes			3,880.00	1.36
	2. Equipment and Building a) Depreciation			13,147.75	6.88
	b) Lease Payments			0.00	0.00
	3. Paid Capital Interest			6,920.00	2.43
	TOTAL CAPITAL COSTS			**23,947.75**	**10.68**
(D)	**CASH COSTS**	(B+C-B19-C2a)		**211,951.19**	**74.54**
(E)	**TOTAL PRODUCTION COSTS**	(B+C)		**242,011.97**	**87.37**
(F)	**GROSS MARGIN**	(A-D)		**157,455.97**	**55.35**
	RETURN TO UNPAID LABOUR	(A-E+B19)		**144,308.22**	**48.47**
	RETURN TO INVESTMENT	(A-E+C2a)	38%	**140,542.94**	**49.40**
	RETURN TO EQUITY	(A-E)		**127,395.19**	**42.52**

Average return to investment was estimated at 38 percent. In terms of total amount it was $140,543 per average greenhouse or $49.40 per square meter. Return to equity amounted to $127,395 per greenhouse or $42.52 per square meter. Details on gross return, production costs and management indicators are presented in Table 19.

Figure 8



SECTION VIII

Greenhouse Production Costs and Returns for Cut Flowers

Greenhouse area in Alberta under cut flowers is relatively small compared to other major greenhouse crops. In the 2010 greenhouse industry survey, the area for cut flowers was estimated at 41 250 square meter or about three percent of the total greenhouse area in the province. Number of greenhouse operations producing cut flowers was estimated 21 in 2010. During the 2010 survey of the greenhouse industry only a few cut flowers producing greenhouses provided production costs and returns data. Therefore, data on greenhouse investment, gross return and production costs obtained in 2008 from three greenhouse operations across the province was updated to 2010. Average size of the greenhouse producing cut flowers was 3 191 per square meter.

Investment for Greenhouses Producing Cut Flowers

Land area associated with an average greenhouse was about four hectares. Land was valued at $54,520 or $17.09 per square meter. Building investment for cut flower greenhouses was estimated at $169,125 or $53.00 per square meter. Machinery and equipment represented almost 62 percent of the total investment, which amounted to $288,186 or $90.31 per square meter. Total value of investment for a 3 191 square meter greenhouse producing cut flowers was about $511,831 or $160.40 per square meter. Details on investments for cut flower greenhouses are given in Table 20.

Greenhouse Production Costs and Returns for Cut Flowers

Gross Return:

Gross return (A) from cut flowers was reported to be $450,084 per greenhouse or $150.33 per square meter. Gross return per square meter was the highest for cut flowers among all of the greenhouse crops analyzed for this report.

Variable Costs:

Variable costs (B) including unpaid labour amounted to $372,720 per average greenhouse (2 994 square meters) producing cut flowers. In terms of variable costs per square meter, these were $124.49, the highest among all the greenhouse crops surveyed. Most significant cost items were growing media, seed/cuttings followed by hired labour and natural gas costs. The detailed breakdown of all variable cost items is presented in Table 21.

Capital Costs:

Capital costs (C) include cost items such as property/business taxes, equipment and building depreciation, lease payments and capital interest payment. These costs were estimated at $51,655 per average greenhouse producing cut flowers or $17.25 per square meter.

Table 20 **Alberta**

Average Investment for Cut Flower Producing Greenhouses, 2010

Greenhouse Area: 3 191 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	54,520.00	17.09
Buildings	169,125.00	53.00
Machinery and Equipment	288,185.84	90.31
TOTAL INVESTMENT	**511,830.84**	**160.40**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land-Building Site:	**54,520.00**		
Greenhouse Buildings:	**169,125.00**	**18.3**	**7,175.00**
Equipment:			
Refrigeration/Freezer Storage	21,125.02	17.7	1,408.33
Warehouses/Storage Sheds	51,249.98	17.5	3,416.67
Fuel Tanks	1,125.00	20.0	75.00
Houses (25%)	46,250.02	21.0	3,083.33
Lighting	12,174.98	12.0	811.67
Heating System	77,750.02	14.7	5,183.33
Ventilation System	0.00	0.0	0.00
Humidity Control	7,500.00	14.3	500.00
Benches	10,500.00	18.3	700.00
Irrigation System	6,666.68	12.7	1,333.33
Water Pumps/Sand Filters	6,000.00	14.7	1,200.00
Soil Mixers/Flat Fillers/Seeding Lines	0.00	5.0	0.00
Generators	4,833.32	20.0	966.67
Roto-Tillers	6,133.32	15.0	1,226.67
Storage/Mixing Tanks	4,500.00	16.7	900.00
Sterilizers	0.00	0.0	0.00
Sprayers	760.82	16.7	152.17
Carts/Dollies	333.32	15.0	66.67
Fertilizer Injectors	2,116.68	9.3	423.33
Small Tools/Hardware	6,500.00	15.8	1,300.00
Sub-Total	**265,519.16**		**22,747.17**
Machinery and Vehicles			
Bobcats/Forklifts	2,000.00	11.0	400.00
Trucks	20,666.68	12.0	4,133.33
Other Machinery	0.00	3.0	0.00
Sub-Total	**22,666.68**		**4,533.33**

Production Costs and Returns for Cut Flower Producing Greenhouses, 2010

Production Area: 2 994 sq. m.

Number of producers: 3

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			450,083.53	150.33
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			0.00	0.00
	GROSS RETURN			**450,083.53**	**150.33**
(B)					
	1. Growing Media, Seed/Cuttings			72,745.22	24.30
	2. Fertilizer and Chemicals			11,119.72	3.71
	3. Greenhouse Insurance			8,553.92	2.86
	4. Trays, Boxes & Other Packaging			12,817.83	4.28
	5. Freight and/or Trucking Costs			22,779.86	7.61
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			10,104.54	3.37
	7. Repairs - Buildings and Equipments			8,829.46	2.95
	8. Utilities: Natural Gas	0.00 GJ		37,312.29	12.46
	9. Electricity	0.00 KW		27,712.70	9.26
	10. Water	0.00 M^3		138.56	0.05
	11. Phone			4,101.31	1.37
	12. Custom Work and Specialized Labour			207.85	0.07
	13. Marketing Costs			1,481.16	0.49
	14. Assoc. Dues, Prof'l Fees and Promotion			10,258.39	3.43
	15. Small Tools, Supplies and Misc. Expenses			3,398.65	1.14
	16. Operating Interest Paid			1,083.36	0.36
	17. Labour Insurance/Benefits			9,943.74	3.32
	18. Hired Labour	6,305.00 hours		103,964.31	34.72
	19. Unpaid Labour	1,600.00 hours		26,166.79	8.74
	VARIABLE COSTS			**372,719.65**	**124.49**
(C)					
	1. Property/Business taxes			14,041.86	4.69
	2. Equipment and Building a) Depreciation			34,460.94	11.51
	b) Lease Payments			0.00	0.00
	3. Paid Capital Interest			3,152.32	1.05
	TOTAL CAPITAL COSTS			**51,655.12**	**17.25**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**363,747.04**	**121.49**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**424,374.77**	**141.74**
(F)	**GROSS MARGIN**	**(A-D)**		**86,336.49**	**28.84**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**51,875.55**	**17.33**
	RETURN TO INVESTMENT	**(A-E+C2a)**	12.3%	**60,169.70**	**20.10**
	RETURN TO EQUITY	**(A-E)**		**25,708.76**	**8.59**

Cash Costs:

Cash Costs (D) for the purposes of this study do not include unpaid labour and depreciation for equipment and buildings. Cash costs for cut flower production were estimated at $363,747 per average greenhouse or $121.49 per square meter. Again, these were the highest costs among all of the greenhouse crops.

Total Production Costs:

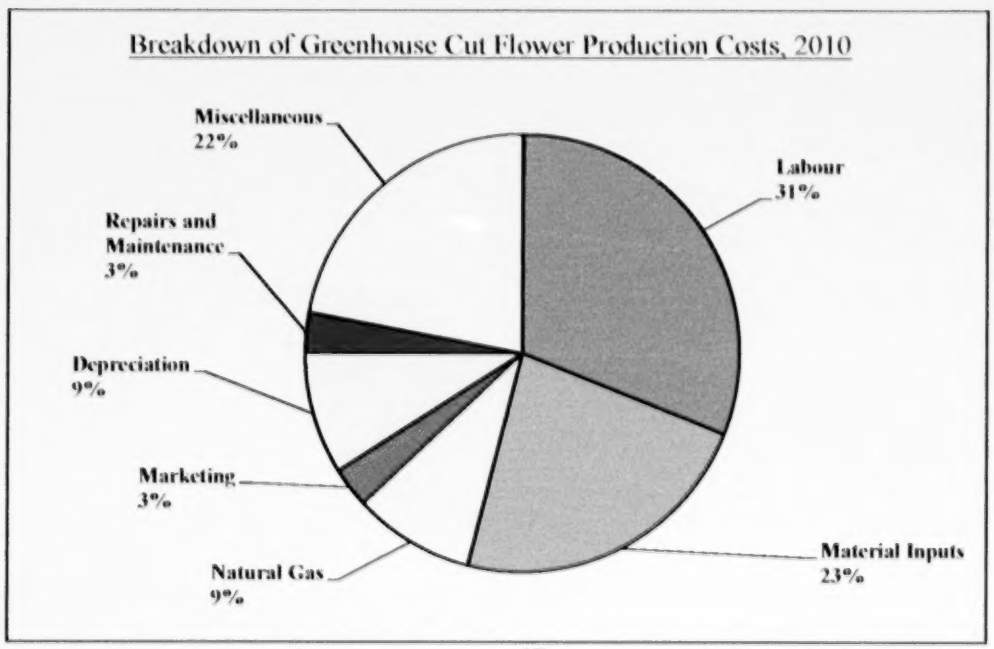
Total production costs (E), which includes all variable costs (B) and capital costs (C) were calculated to be $424,375 per average greenhouse producing cut flowers (2.994 per square meter). These were $141.74 per square meter for cut flowers produced in 2010. Total production costs for cut flower production were the highest among all crops produced in greenhouses. Details on production costs are given in Table 21. Figure 9 presents the breakdown of production costs for greenhouse cut flower production.

Management Indicators:

Gross margin (F) for cut flowers production was $86,336 per greenhouse or $28.84 per square meter. On per unit basis, it was the second highest among all of the crops in 2010 after bedding plants/ornamentals.

Average return to unpaid labour was estimated at $51,876 per greenhouse or $17.33 per square meter. Return to investment for cut flower production was calculated at 12.3 percent. It was $60,170 per greenhouse and $20.10 per square meter. Return to equity was also positive at $25,709 per greenhouse ($8.59 per square meter). The details on management indicators are presented in Table 21.

Figure 9



SECTION IX

Greenhouse Production Costs and Returns for Tree Seedlings

Greenhouse tree seedling production in Alberta received a big boost in the late eighties when a decision was made to encourage local production of seedlings. Prior to this, forestry tree seedlings were largely imported from British Columbia. As soon as the contracts to grow seedlings locally became available, several existing greenhouses switched to producing seedlings. At the same time quite a few new greenhouses were also built to meet the contractual demand. Presently, tree seedlings are the third largest greenhouse crop after bedding plants and cucumbers. In 2010, tree seedlings were produced on about 165 029 square meters (16.5 hectares) of greenhouse area in the province. The greenhouse area under tree seedlings has decreased marginally over the last three years. Survey of the greenhouse industry in 2010 revealed that there were 26 greenhouse operations engaged in tree seedling production. Average area per tree seedling producing greenhouse was estimated at 6 347 square meter in 2010.

Data on greenhouse tree seedlings investment, production costs and returns was obtained from seven greenhouse operations across the province. Greenhouse operations producing tree seedlings were significantly higher than the industry average mentioned above. Average greenhouse area for the seven participants was 11 596 square meters. It is worth noting that greenhouse tree seedlings are produced under contract by forestry companies and the provincial government.

Investment for Tree Seedling Greenhouses

The average greenhouse area for the seven tree seedling operations was estimated at 11 596 square meters, which was significantly higher than the industry average of 6 347 square meters. Land area associated with these greenhouses average around 9.3 hectares valued at $126,429 per greenhouse ($10.90 per square meter).

Investment in the greenhouse buildings for tree seedling operations was calculated at $567,092 per operation or $48.90 per square meter. Average investment in machinery and equipment including vehicles amounted to over one million dollars per greenhouse ($86.93 per square meter) with an average size of 11 596 square meter. When land, buildings, machinery and equipment investments were combined, total investment was estimated at $1.7 million per operation. In terms of dollars per square meter it was $146.73. Details on land, buildings, machinery and equipment investment and depreciation amounts are presented in Table 22.

Greenhouse Production Costs and Returns for Tree Seedlings

Gross Return:

Gross return (A) represents sales of tree seedlings to the contractors at the agreed price and any income received under crop insurance, etc. Total gross return for an average greenhouse (10 779 square meter) producing tree seedlings was estimated at about $1 million or $98.16 per square meter. Details on gross return from sale of tree seedlings are presented in Table 23.

Average Investment for Tree Seedling Producing Greenhouses, 2010

Greenhouse Area: 11 596 sq. m.

INVESTMENT SUMMARY:	Total $	$/sq. m.
Land	126,428.57	10.90
Buildings	567,091.80	48.90
Machinery and Equipment	1,008,015.36	86.93
TOTAL INVESTMENT	**1,701,535.73**	**146.73**

INVESTMENT DETAIL:	Enterprise Value ($)	Age (Years)	Depreciation ($)
Land-Building Site:	**126,428.57**		
Greenhouse Buildings:	**567,091.80**	**16.9**	**24,058.44**
Equipment:			
Refrigeration/Freezer Storage	43,371.42	9.1	2,891.43
Warehouses/Storage Sheds	195,535.74	19.6	13,035.71
Fuel Tanks	3,407.16	14.7	227.14
Houses (25%)	17,946.42	24.6	1,196.43
Other Buildings	750.00	5.1	50.00
Lighting	51,696.42	10.3	3,446.43
Heating System	246,428.58	14.6	16,428.57
Ventilation System	67,178.58	14.7	4,478.57
Humidity Control	38,250.00	10.3	2,550.00
Benches	113,571.42	13.9	7,571.43
Irrigation System	40,621.41	14.1	8,124.29
Water Pumps/Sand Filters	3,571.41	15.3	714.29
Soil Mixers/Flat Fillers/Seeding Lines	37,785.73	15.4	7,557.14
Generators	12,214.27	18.6	2,442.86
Roto-Tillers	285.73	6.0	57.14
Storage/Mixing Tanks	7,478.59	15.7	1,495.71
Sterilizers	2,857.14	7.1	571.43
Sprayers	900.00	10.7	180.00
Carts/Dollies	33,234.27	12.7	6,646.86
Fertilizer Injectors	6,742.86	14.0	1,348.57
Small Tools/Hardware	7,285.73	13.1	1,457.14
Sub-Total	**931,112.88**		**82,471.14**
Machinery and Vehicles			
Bobcats Forklifts	34,399.99	12.1	4,914.29
Trucks	42,502.49	10.3	6,071.79
Other Machinery	0.00	0.0	0.00
Sub-Total	**76,902.48**		**10,986.08**

Production Costs and Returns for Tree Seedling Producing Greenhouses, 2010

Production Area: 10 779 sq. m.

Number of producers: 7

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			1,058,115.15	98.16
	2. Crop Insurance Receipts			0.00	0.00
	3. Miscellaneous Receipts			0.00	0.00
	GROSS RETURN			**1,058,115.15**	**98.16**
(B)					
	1. Growing Media, Seed/Cuttings			42,318.35	3.93
	2. Fertilizer and Chemicals			15,090.40	1.40
	3. Greenhouse Insurance			18,068.40	1.68
	4. Trays, Boxes and Other Packaging			81,075.50	7.52
	5. Freight and/or Trucking Costs			7,189.77	0.67
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			13,493.06	1.25
	7. Repairs - Buildings and Equipment			24,236.02	2.25
	8. Utilities: Natural Gas	0.00 GJ		86,480.40	8.02
	9. Electricity	0.00 KW		41,280.36	3.83
	10. Water	0.00 M3		3,117.85	0.29
	11. Phone			5,154.01	0.48
	12. Custom Work and Specialized Labour			3,741.42	0.35
	13. Marketing Costs			70,776.44	6.57
	14. Assoc. Dues, Prof'l Fees and Promotion			15,227.46	1.41
	15. Small Tools, Supplies and Misc. Expenses			33,662.84	3.12
	16. Operating Interest Paid			8,915.04	0.83
	17. Labour Insurance/Benefits			19,223.05	1.78
	18. Hired Labour	25,069.43	hours	322,752.28	29.94
	19. Unpaid Labour	2,267.14	hours	23,636.65	2.19
	VARIABLE COSTS			**835,439.30**	**77.51**
(C)					
	1. Property/Business taxes			7,536.29	0.70
	2. Equipment and Building a) Depreciation			117,515.65	10.90
	b) Lease Payments			0.00	0.00
	3. Paid Capital Interest			16,001.71	1.48
	TOTAL CAPITAL COSTS			**141,053.65**	**13.09**
(D)	**CASH COSTS**	(B+C-B19-C2a)		**835,340.65**	**77.50**
(E)	**TOTAL PRODUCTION COSTS**	(B+C)		**976,492.95**	**90.59**
(F)	**GROSS MARGIN**	(A-D)		**222,774.50**	**20.67**
	RETURN TO UNPAID LABOUR	(A-E+B19)		**105,258.85**	**9.77**
	RETURN TO INVESTMENT	(A-E+C2a)	11.7%	**199,137.85**	**18.47**
	RETURN TO EQUITY	(A-E)		**81,622.20**	**7.57**

Variable Costs:

Variable costs (B), which include unpaid labour amounted to $835,439 per greenhouse for the 2010 tree seedlings production. In terms of per square meter, these costs were estimated at $77.51. The most significant cost item was hired labour at $29.94 per square meter, almost 33 percent of all variable costs. Other significant costs were natural gas, followed by trays, boxes and other packaging, repairs to buildings and equipment and electricity. A detailed breakdown of all variable costs is presented in Table 23.

Capital Costs:

Capital costs (C) include property/business taxes, equipment and building depreciation, lease payments and paid capital interest. These costs were estimated at $141,054 per average greenhouse producing tree seedlings or $13.09 per square meter. Almost 83 percent of the capital costs were equipment and building depreciation.

Cash Costs:

Cash costs (D) consist of all out-of-pocket costs incurred during the tree seedlings production period. Cash costs were estimated at $835,341 per greenhouse or $77.50 per square meter. These costs were very close to the variable costs.

Total Production Costs:

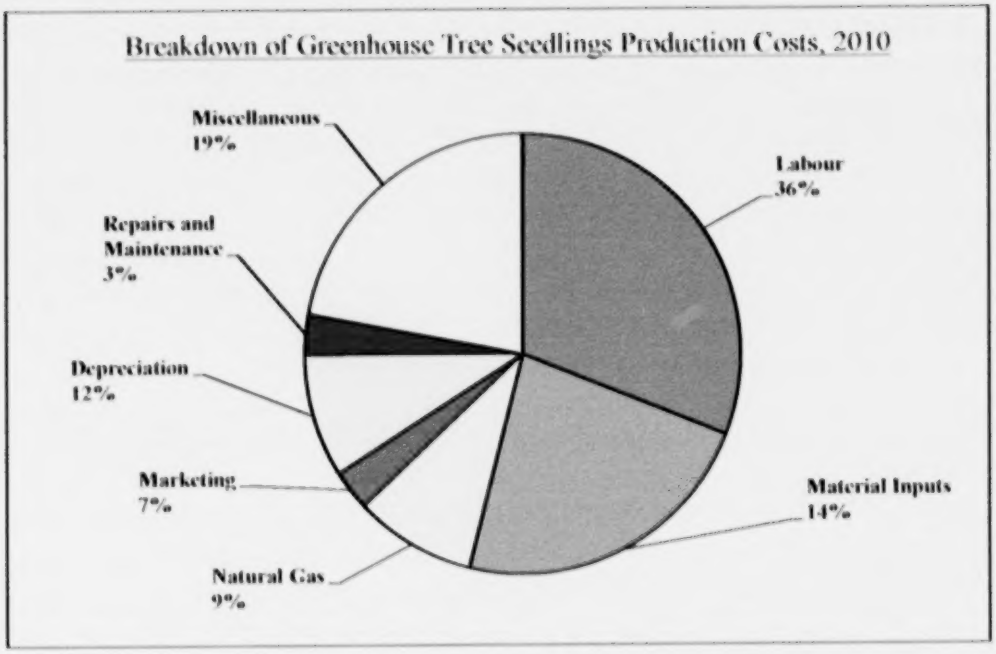
Average total production costs for tree seedling greenhouses were estimated at $976,493 or $90.59 per square meter of greenhouse production area in 2010. As mentioned above, the most significant cost items were hired labour, depreciation, natural gas and trays, boxes and other packaging. Details on various costs are presented in Table 23. Figure 10 presents the breakdown of all production costs for greenhouse tree seedling production.

Management Indicators:

Management indicators present data on gross margin (F), return to unpaid labour, return to investment and return to equity. Gross margin is based on gross return (A), less cash costs (D). For an average tree seedling producing greenhouse, gross margin was calculated at $222,774 or $20.67 per square meter. A positive gross margin shows that enterprise is economically feasible.

Average return to unpaid labour was positive at $105,259 per greenhouse producing tree seedlings. It was $9.77 per square meter. Return to investment was calculated at $199,138 per average greenhouse or $18.47 per square meter. In terms of percentage return to investment it was calculated at 11.7 percent. Return to equity, another management indicator was also positive at $81,622 per greenhouse or $7.57 per square meter. Details on management indicators are presented in Table 23.

Figure 10


Breakdown of Greenhouse Tree Seedlings Production Costs, 2010
Miscellaneous 19%
Labour 36%
Repairs and Maintenance 3%
Depreciation 12%
Marketing 7%
Material Inputs 14%
Natural Gas 9%

SECTION X

SUMMARY

Summary of Costs and Returns

This section provides a summary of 2010 costs and returns data for the various greenhouse crops produced across the province. Data on the major greenhouse crops was obtained from forty (40) greenhouse operations scattered throughout Alberta. Distribution of the study sample by crops was as follows:

Greenhouse Crop	Number of Participants
Cucumber	12
Tomatoes	6
Peppers	7
Bedding Plants/Ornamentals	5
Cut Flower	3
Tree Seedlings	7
Total	40

Investment and investment costs were computed from the data provided by study participants by crops. Total investment per greenhouse and cost per square meter are presented in Table 24 by various crops. Average investment cost per square meter ranged from $110.48 for tomatoes in North-Central area to $168.95 for cucumber producing greenhouses in North-Central.

Gross return per square meter was the highest for cut flower production at $150.33. Gross return for cucumbers in Medicine Hat/Redcliff area was $84.98 per square meter compared to $124.29 in North-Central Alberta. Gross return for tomatoes was $116.42 and $110.48 per square meter for Medicine Hat/Redcliff and North-Central Alberta, respectively. For greenhouse peppers, gross return was $94.13 per square meter in North-Central area. Gross return for bedding plants and ornamentals was estimated at $129.89 per square meter second highest after cut flowers. Gross return for tree seedlings production was estimated at $98.16 per square meter in 2010.

Average production costs for the 2010 crop year, summarized by types of crops produced in greenhouses in Alberta, are presented in Table 24. Major production costs varied by type of crops produced in the greenhouses. However, these can be categorized as labour (hired and operator), material inputs, marketing costs and natural gas. Total production costs ranged from a low of $75.84 per square meter for cucumber producing greenhouses in Medicine Hat/Redcliff area to a high of $141.74 per square meter for cut flower greenhouses.

Greenhouses producing bedding plants/ornamentals showed the highest gross margin per square meter at $56.46 followed by cut flowers at $28.84. Gross margin per square meter for peppers in North-Central was estimated at $26.42, tomatoes in North-Central Alberta at $26.03, tomatoes in Medicine Hat/Redcliff at $21.45 and cucumbers in North-Central at $19.53 and $15.77 in Medicine Hat/Redcliff area. Average return to equity was positive for cucumbers, tomatoes, peppers and all other crops. Similarly, return to equity for all greenhouse crops (cucumbers, tomatoes, peppers, bedding plant/ornamentals, cut flowers and tree seedlings) was positive. Details on costs and returns are presented in Table 24.

Table 24

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS BY CROPS, 2010

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med Hat/ Redcliff			
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. meter)	8 540	3 824	12 670	10 717	9 907	2 844	2 994	10 779
----------dollars per square meter----------								
Average Investment	129.68	168.95	116.42	110.48	142.03	130.13	160.40	146.73
Gross Return	**84.98**	**124.29**	**108.45**	**106.95**	**94.13**	**129.89**	**150.33**	**98.16**
Material Inputs	10.81	12.92	9.23	10.39	10.75	21.38	32.29	12.85
Natural Gas	9.02	7.50	12.07	8.72	10.99	4.36	12.46	8.02
Hired Labour	19.88	30.91	27.92	28.86	20.94	26.92	34.72	29.94
Marketing Costs	16.90	17.37	23.85	18.29	12.85	0.35	0.49	6.57
Other Cash Costs	9.58	32.01	10.59	11.70	10.50	17.74	35.79	17.94
Operator Labour	0.00	0.76	1.18	0.00	0.00	5.95	8.74	2.19
Capital Costs	9.66	13.69	11.47	10.22	10.60	10.67	17.25	13.09
Total Production Costs	**75.84**	**115.15**	**96.31**	**88.19**	**76.63**	**87.37**	**141.74**	**90.59**
Gross Margin	15.77	19.53	21.45	26.03	26.42	55.35	28.84	20.67
Return to Investment	15.77	18.77	20.27	26.03	26.42	49.40	20.10	18.47
Return to Equity	9.14	9.14	12.14	18.76	17.50	42.52	8.59	7.57

Appendix – Table 1

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS BY CROPS, 2008

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings*
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff			
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. meter)	8 540	3 824	12 670	10 717	9 907	2 844	2 994	10 779
----------dollars per square meter----------								
Average Investment	140.62	189.89	130.75	125.67	127.50	139.31	172.00	195.50
Gross Return	**82.24**	**126.79**	**109.06**	**103.96**	**102.62**	**129.89**	**170.37**	**93.49**
Material Inputs	12.27	13.78	11.53	12.55	11.14	21.58	17.21	10.59
Natural Gas	15.26	7.05	20.43	14.76	18.71	7.38	12.91	9.94
Hired Labour	18.39	28.88	25.82	26.69	17.17	24.90	30.49	23.17
Marketing Costs	16.89	17.03	23.83	18.28	13.37	0.35	0.54	4.38
Other Cash Costs	10.09	32.64	11.22	12.43	9.13	18.64	58.76	19.41
Operator Labour	0.00	0.71	1.09	0.00	0.00	5.50	4.59	2.08
Capital Costs	11.20	13.43	12.90	11.40	12.13	10.68	10.62	13.09
Total Production Costs	**84.11**	**113.52**	**106.81**	**96.11**	**81.65**	**89.03**	**135.12**	**82.66**
Gross Margin	4.76	23.61	11.47	15.12	29.75	53.24	49.75	23.82
Return to Investment	4.76	22.90	10.38	15.12	29.75	47.74	45.16	21.74
Return to Equity	(1.87)	13.27	2.25	7.85	20.97	40.86	35.25	10.84

*carried forward from the 2005 survey.

Appendix - Table 2

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS BY CROPS, 2005								
	Cucumbers		**Tomatoes**		**Peppers**	**Bedding Plants/ Ornamentals**	**Cut Flowers**	**Tree Seedlings**
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	North-Central			
Number Survey	6	4	6	5	4	6	3	7
Average Production Area (sq. meter)	6 753	4 480	5 603	4 262	7 305	1 671	2 994	10 779
----------dollars per square meter----------								
Average Investment	100.42	170.74	139.80	178.94	201.07	174.57	214.40	195.50
Gross Return	**88.21**	**90.72**	**90.80**	**97.84**	**94.30**	**135.39**	**143.31**	**93.49**
Material Inputs	14.95	11.98	11.24	11.47	11.74	27.04	25.52	10.59
Natural Gas	16.07	18.31	15.89	18.71	19.57	13.94	15.44	9.94
Hired Labour	16.59	20.10	21.80	24.98	18.09	28.19	26.87	23.17
Marketing Costs	15.24	15.26	19.56	11.76	14.41	1.68	0.33	4.38
Other Cash Costs	11.98	20.04	15.57	13.49	13.48	24.31	33.20	19.41
Operator Labour	0.77	1.90	0.15	1.24	2.22	8.34	8.29	2.08
Capital Costs	10.94	13.68	10.68	17.62	16.01	13.66	17.10	13.09
Total Production Costs	**86.54**	**101.47**	**94.89**	**99.27**	**95.52**	**117.16**	**126.75**	**82.66**
Gross Margin	7.20	0.38	3.21	9.24	11.05	36.61	36.36	23.82
Return to Investment	6.43	(1.52)	3.06	8.00	8.83	28.26	28.07	21.74
Return to Equity	1.67	(10.75)	(4.09)	(1.43)	(1.23)	18.23	16.56	10.84

Appendix – Table 3

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS BY CROPS, 2000						
	Cucumbers	**Tomatoes**	**Peppers**	**Bedding Plants/ Ornamentals**	**Cut Flowers**	**Tree Seedlings**
Number Survey	10	7	5	7	6	7
Average Production Area, (square meter)	4 958	3 272	3 435	2 443	2 176	10 396
----------dollars per square meter----------						
Average Investment	135.15	152.25	156.67	112.66	205.20	165.70
Gross Revenue	**64.67**	**82.85**	**93.07**	**84.90**	**136.54**	**83.17**
Material Inputs	9.15	11.84	12.48	14.96	31.63	10.33
Natural Gas	10.44	17.22	11.73	7.42	11.62	8.82
Hired Labour	8.72	14.20	9.90	13.67	26.68	33.14
Marketing Costs	10.65	11.51	11.62	2.80	2.69	4.30
Other Cash Costs	11.51	12.37	10.01	8.29	31.10	13.77
Operator Labour	4.95	3.66	6.67	16.46	5.38	1.29
Capital Costs	13.56	15.38	15.60	9.58	13.34	10.76
Total Production Costs	**68.97**	**86.19**	**78.01**	**73.17**	**122.45**	**82.42**
Gross Margin	7.32	8.07	30.56	34.65	30.99	11.51
Return to Investment	2.37	4.41	23.89	18.08	25.61	10.22
Return to Equity	(4.41)	(3.34)	15.16	11.62	14.20	0.75